

THE

P.D. 2465

Gentleman's Diary,

OR THE

MATHEMATICAL REPOSITORY;

An ALMANACK

For the YEAR of our LORD 1753.

Being the First after BISSEXTILE, or
LEAP YEAR.

Containing many useful and entertaining Particulars,
peculiarly adapted to the ingenious Gentlemen en-
gaged in the Study and Practice of the

MATHEMATICKS.

The Thirteenth *Almanack* publish'd of this Kind;
And the First of the NEW STYLE in *England*.

— Quâ causâ argentea Phœbe
Passibus haud æquis graditur; cur subdita nulli
Hactenus Astronomo numerorum fræna recusat:
Cur remeant Nodi, curque Auges progrediuntur.

— Quantis refluxum vaga Cynthia pontum
Viribus impellit; dum fractis fluctibus ulvam
Deserit, ac Nautis suspectas nudat arenas,
Alternis vicibus supremâ ad littora pulsans.

L O N D O N,

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MDCCLIII.



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JANUARY hath xxxi Days.

M Moons
D place.

New Moon	4 Day at 35 m. past 2 in the Aftern.	7	7 2
First Quarter	12 Day at 37 m. past 4 in the Aftern.	6	6 57
Full Moon	19 Day 42 min. past 10 in the Morn.	11	7 29
Last Quarter	26 Day 2 min. past 6 in the Morn.	16	14 59
		21	over 49
		26	9 m 36

1 M	Circumcision, New Years Day.	5 M	9	9 M 28
2 Tu	The Weather may possibly be as cold at	6	1	10 15
3 W	the beginning of this New Year	7	11	1
4 Th	Days increased 12 Minutes.	8	12	47
5 F	Old Chrism. D. Fast at Porting.	9	13	0 A 36
6 S	Epiph. CHRIST'S * app. to Gentiles	10	14	1 25
7 G	1 Sunday after Epiphany.	11	15	2 10
8 M	Luctan, Priest and m.	12	16	2 47
9 W	as it was last Christmas; however	1	17	3 34
10 Tu	Princess ELIZABETH born.	2	18	4 17
11 Th	Days now increase 25 Minutes.	3	19	5 3
12 F	Old New Years Day.	4	20	5 49
13 S	Hillary, Bish. and Con.	5	21	6 37
14 G	2 Sunday after Epiphany	6	22	7 29
15 M	expect January Weather to be	7	23	8 27
16 Tu	constant (though perhaps	8	24	9 28
17 W	Days increased 42 Minutes.	9	25	10 26
18 Th	Prisca, Rom. V. and M.	10	26	11 30
19 F	(sometimes variable) now [Ret.	11	27	Morn.
20 S	Fabian, B. of Rom. M. Oct. Hill.	12	28	0 23
21 G	3 Sunday after Epiphany, Agnes	1	29	1 21
22 M	Alinc, Span. Deac. M.	2	30	2 17
23 Tu	Hillary Term begins.	3	31	3 7
24 W	Days increased 1 Hour.	4	1	4 0
25 Th	Conversion of Saint PAUL.	5	2	4 47
26 F	and certainly will	6	3	5 39
27 S	Quind. Hill. 2 Ret.	7	4	6 29
28 G	4 Sunday after Epiphany.	8	5	7 17
29 M	continue to be such to	9	6	8 7
30 Tu	K. CHARLES I. Mart.	10	7	8 55
31 W	the last Day of this Month.	11	8	9 43

M D	☉ Rises	☉ Sets	☿ Rises	☿ Sets	♂ Rises	♂ Sets	♀ Rises	♀ Sets	W. fast
1	8 17	3 43	7 M 12	8 M 8	5 M 32	6 A 46	5 A 16	2 45	
6	8 12	3 48	6 59	7 44	5 29	7 0	4 46	5 38	
11	8 9	3 52	6 33	7 20	5 26	7 14	Rises	8 36	
16	8 14	4 06	6 13	7 06	5 22	7 28	6 M 48	10 52	
21	7 52	4 9	5 55	6 32	5 19	7 42	6 23	12 35	
26	7 42	4 19	5 37	6 9	5 16	7 57	6 13	13 50	

FEBRUARY hath xxviii Days. M Moon D place.

New Moon 3 Day 49 min. past 9 in the Morn.	1	22	2
First Quarter, 11 Day 55 min. past 5 in the Morn.	6	22	5
Full Moon 17 Day 56 min. past 8 at Night.	11	26	2
Last Quarter 24 Day 16 min. past 11 at Night.	16	8	30
	21	21	49
	26	15	2

M	W	Sundays, Holidays, remarkable Days	rise	Moon
D	D	Len. Incr. and Decr. of Days, Terms	and sets	South
		Weather.		
1	Th	Days increas'd, 1 ho. 42 min. <i>Fast</i> .	5 M 57	10 M 27
2	F	Purif. V. Mary. Candlemas Day.	6 30	11 16
3	S	Blasius, B. and M. Cr. p. 3. Ret.	7 Sets	11 57
4	G	5 Sunday after Epiphany. [Paul]	6 A 41	0 A 43
5	M	Agatha Sicilian V. and M. Old St.	7 30	1 21
6	Tu	Day 9 hours and a quarter, and	8 34	2 5
7	W	Night 14 ho. and 3 quarter long.	9 40	2 49
8	Th	<i>The Weather this Month</i>	10 45	3 35
9	F	<i>is like enough to be Winterly</i>	11 49	4 22
10	S	Octab. Purif. 4 Returns.	Morn.	5 14
11	G	6 Sunday after Epiphany.	1 2	6 9
12	M	Hilary Term ends.	2 11	7 9
13	Tu	Old Candlemas Day.	3 20	8 6
14	W	Valentine Bish. and M.	4 7	9 2
15	Th	Days 9 hours and 3 quarters long.	4 50	10 3
16	F	Days increas'd 2 hours and an half	5 31	11 0
17	S	<i>Dirty and unpleasant</i>	6 Rise	11 57
18	G	Septuagesima Sunday.	6 A 29	Morn.
19	M	<i>especially for those</i>	7 50	0 51
20	Tu	<i>who undertake long Journeys</i>	9 10	1 45
21	W	<i>badly mounted,</i>	10 17	2 40
22	Th	Days increas'd 2 hours 54 min.	11 39	3 31
23	F	<i>and the Pockets. Fast [Fasting]</i>	Morn.	4 23
24	S	St. MATTHIAS A. & M. Fair at	0 41	5 11
25	G	Sexagesima Sunday.	1 45	6 4
26	M	<i>but ill supply'd (or furnish'd)</i>	2 39	6 49
27	Tu	<i>wish ready Money (alias Cash.)</i>	3 21	7 39
28	W	Day 10 hours. 32 min. long.	4 5	8 34

M	D	☉ Rises	☉ Sets	☽ Rises	☽ Sets	☿ Rises	☿ Sets	♂ Rises	♂ Sets	♀ Rises	♀ Sets	W. fast.
1	7	31	4	30	5 M 15	5 M 42	5 M 17	4 A 24	6 M 11	10	50	
6	7	24	4	37	4 56	5 20	5 7	3 5	5 17	12	30	
11	7	17	4	43	4 39	5 0	5 3	3 44	6 19	14	43	
16	7	5	4	5	4 21	4 39	5 1	3 38	6 23	14	31	
21	6	55	5	4	3 4	4 20	5 1	3 12	6 23	13	41	

MARCH hath xxxi Days.

M D Moons place.

New Moon	5 Day 42 min. past 3 in the Morn.	1	0	41
First Quarter	12 Day 44 min. past 3 in the Aftern.	6	19	21
Full Moon	19 Day 26 min. past 7 in the Morn.	11	6	118
Last Quarter	26 Day 3 min. past 6 in the Aftern.	16	17	32
		21	29	39
		26	3	11

1 Th	David Archb. Menev.	4 M	39	9 M	17
2 F	Cedde or Chad B. Litch.	4	59	9	53
3 S	Princess of Hesse born.	5	21	10	40
4 G	Quinquages. Shrove Sunday.	D Sets	11	21	
5 M	Day 11 hours long.	6 A	25	0 A	11
6 Tu	Old St. MAT. Shrove Tuesday.	7	29	0	57
7 W	Perpetua Mauric. Ash Wednes.	8	39	1	40
8 Th	Day lengthen'd 3 hours 3 quarters.	9	49	2	31
9 F	Not very unpleasant Weather now; yet	10	50	3	19
10 S	the near approach of the Spring	Morn.	4	11	
11 G	Sunday in Lent. Quadragesima.	0	20	5	7
12 M	makes us expect (if it be so at pre-	1	17	6	0
13 Tu	sent) it will be better soon.	2	9	7	1
14 W	Ember Week	3	5	8	0
15 Th	Rising Amplitude 3° 30' South.	3	41	8	57
16 F	Day 11 hours 3 quarters long.	4	15	9	54
17 S	Days increas'd 4 hours and half	4	51	10	47
18 G	Sunday in Lent Reminiscere.	D Rise	11	40	
19 M	Equal Day and Night in all	6 A	46	Morn.	
20 Tu	Day 11 hours 35 min. past 10 in the Morn.	7	59	0	31
21 W	the habitable Parts of this Globe.	9	9	1	25
22 Th	still expect March Winds,	10	21	2	11
23 F	and (probably) storms of Hail.	11	29	3	7
24 S	Rain Sleet or Snow. Fast.	Morn.	3	59	
25 G	S. in Lent. Annunc. Pr. EDWARD B.	0	27	4	49
26 M	Day 12 hours and half long.	1	24	5	40
27 Tu	☉ Due E. 6. ho. 7. m. Alt. 20. 58	2	7	6	27
28 W	If the Weather be still Rough, Cold,	2	39	7	15
29 Th	Tempestuous &c. expect better in April	3	9	8	1
30 F	☉ Amplitude North 7 degrees	3	37	8	40
31 S	Day 12 hours and 3 quarters long.	4	0	9	25

M D	☉ Rises	☉ Sets	☿ Rises	☿ Sets	♂ Rises	♂ Sets	♀ Rises	♀ Sets	♂ Rises	♀ Sets
1	5	37	5	22	3 M	25	3 M	49	4 M	43
6	6	28	5	32	3	18	3	31	4	37
11	6	20	5	40	3	1	3	13	4	30
16	6	7	5	53	2	44	2	55	4	22
21	5	54	6	1	27	2 A	39	4	14	10
26	5	45	6	1	3	2	32	4	6	10

APRIL hath xxx Days.

M D Moon place.

New Moon 3 Day 14 min. past 7 at Night.
 First Quarter 10 Day 43 min. past 10 at Night.
 Full Moon 17 Day 30 min. past 6 in the Aftern.
 Last Quarter 25 Day 55 min. past Noon.

15 10
 6 19 37
 11 29 51
 16 10 18
 21 16 34
 26 16 53

1	G	4 Sunday in Lent, or Midlent Sund.	4	M 21	10	M 1
2	M	Days increas'd 5 hours and half.	4	41	10	51
3	Tu	Richard Bish. of Chich.	5	Sets	11	39
4	W	St. Ambrose, Bish. of Mil.	7	A 47	0	A 28
5	Th	Old Lady Day.	9	1	1	21
6	F	Day 13 hours 10 min. and	10	10	2	10
7	S	Night 10 hours and 50 min. long.	11	17	3	10
8	G	5 Sunday in Lent.		Morn.	4	7
9	M	The Weather may now be	0	18	5	1
10	Tu	expected to be tolerable good;	1	9	6	0
11	W	Days are now increas'd and Nights	1	52	6	54
12	Th	decreased 6 hours and a quarter,	2	31	7	53
13	F	but, if it be not so, we have reason to	3	1	8	48
14	S	hope for better, before the End.	3	24	9	37
15	G	6 Sunday in Lent. Palm Sunday.	3	49	10	27
16	M	Day 13 hours 50 min. long.	4	15	11	17
17	Tu	☾ Eclips'd visible.		Rises	Morn.	
18	W	☉ due E. 6ho. 37' Alt. 14° 50.	8	A 14	0	11
19	Th	Fair at Rotting. Alphage A. B.	9	15	1	2
20	F	GOOD FRID. Our SAV. Crucif.	10	31	1	51
21	S	Days increas'd, 6 hours 56 min.	11	19	2	47
22	G	EASTER DAY. Our SAV. Ref.		Morn.	3	39
23	M	Easter Monday. St. George	0	3	4	27
24	Tu	Easter Tuesday,	0	47	5	11
25	W	St. MARK the Evangelist.	1	15	5	58
26	Th	Prince WILLIAM born.	1	45	6	48
27	F	Day 14 hours 34 min. long.	2	11	7	29
28	S	☉ due East 6 ho. 50' Alt. 19° 30.	2	30	8	19
29	G	1 Sund. after Easter. Low Sunday.	2	45	8	57
30	M	☉ rises Amplitude 25° 47'	3	30	9	41

M D	☉ Rises	☉ Sets	☾ Rises	☾ Sets	♂ Ri	♀ Sets	♂ Sets	W. full
1	5 36	6 24	1M48	2M 3	3M57	11A 57	7A 40	4 40
6	5 25	6 35	1 30	1 46	3 47	11 15	8 18	3 20
11	5 14	6 46	1 12	1 30	3 36	11 23	8 44	3 0
16	5 05	6 55	0 54	1 15	3 26	11 30	9 0	0 59
21	4 53	7 07	0 36	0 59	3 16	11 22	8 57	Slow

MAY hath xxxi Days.

M Moon's
D place

New Moon 3 Day 48 min. past 7 in the Morn.
First Quarter 10 Day at 4 in the Morning.
Full Moon 17 Day 30 min. past 6 in the Morn.
Last Quarter 25 Day 43 m. past 6 in the Morn.

118 140
6 27 11 16
11 8 25
16 16 26
21 19 1
26 18 51

1 Tu	St. PHIL. and JAC. Ap. and M.	3 M 29	10 M 26
2 W	Day 14h. and 56 min. long.	Sets	11 15
3 Th	Invention of the Cross.	8 A 2	0 A 11
4 F	Days increas'd 7 hours 3 quarters	9 11	1 7
5 S	<i>As May-Day happens sooner by</i>	10 15	2 4
6 G	2 Sunday after Easter. Misericor.	11 15	2 59
7 M	Quind. Pasch. 1 Return.	11 59	4 0
8 Tu	11 Days than it did the last Year,	Morn.	4 58
9 W	Easter Term begins.	0 35	5 51
10 Th	Day 15 hours 20 min. long.	1 7	6 45
11 F	Days increas'd 8 ho. 9 min.	1 30	7 35
12 S	Old May-Day	2 1	8 27
13 G	3 Sunday after Easter. Jubilate	2 24	9 15
14 M	Tref. Pasch 2 Return.	2 49	10 3
15 Tu	<i>if it rain, it will be like Old fashioned</i>	3 17	10 57
16 W	Days increas'd 8 hours 1 quarter.	Rises	11 49
17 Th	April Showers; but now, we may,	8 A 17	Morn.
18 F	☉ due E. 2 m. before 7 Alt. 25°. 25'	9 15	0 40
19 S	Dunstan Archb. Cant.	10 5	1 30
20 G	4 Sunday after Easter. Cantate.	10 45	2 21
21 M	Moos. Pasch 3 Return.	11 19	3 11
22 Tu	<i>expect such like Weather as was on,</i>	11 50	3 57
23 W	<i>or about the 12th of last May, &c.</i>	Morn.	4 43
24 Th	No real Night, but all Twiligh.	0 19	5 21
25 F	Day 16 ho. Night 8 hours long.	0 42	6 7
26 S	Aug. first Archb. Cant.	1 8	6 51
27 G	5 Sunday after Easter. Rogat. Sunday	1 23	7 35
28 M	Quind. Pasch 4 Return.	1 40	8 29
29 Tu	K. CHAR. II. Nat. and Return:	2 3	9 7
30 W	Rogation Week	2 29	9 56
31 Th	Holy Thursd. CHRIST's Ascens.	3 5	10 49

M D	☉ Rises	☉ Sets	☿ Rises	☿ Sets	♂ Rises	♀ Sets	♂ Sets	W. flow
1	4 32	7 28	11 A 53	0 M 27	2 M 54	11 A 30	3 A 5	2 40
6	4 25	7 35	11 33	0 11	2 41	11 22	Rises.	3 30
11	4 18	7 42	11 14	11 A 52	2 28	11 8	1 M 17	3 59
16	4 7	7 53	10 53	11 34	2 16	10 48	4 1	4 5
21	4 1	7 59	10 32	11 18	2 3	10 32	3 46	3 43
26	4 1	8 10	10 11	11 1	2 1	10 1	3 1	3 1

JUNE hath xxx Days.

M Moon
D place

New Moon	1 Day 34 min. past 5 in the Aftern.	1	7 II 54
First Quarter	8 Day 2 min. past 9 in the Morn.	6	20 56
Full Moon	15 Day 26 min. past 7 in the Morn.	17	29 53
Last Quarter	23 Day 34 min. past 10 at Night.	16	31 10
		21	38 1
		26	48 43

1 F	Nicom. Rom. Pr. & M. Cra. Asc. 5 R.	☾ Sets	11 M 41
2 S	Day 8 hours 24 min. long.	8 A 57	0 A 45
3 G	6 Sunday after Easter. Exaudi	9 50	1 47
4 M	Prince of WALES born. Term ends.	10 27	2 48
5 Tu	Boniface B. of Mentz. M.	11 6	3 44
6 W	Days increas'd 9 ho. 12 minutes.	11 39	4 39
7 Th	<i>Fine pleasant Summer Weather</i>	Morn.	5 31
8 F	<i>may reasonably be expected,</i>	0 07	6 17
9 S	Prs. AMEL. & CAROL. born. the 10.	0 31	7 7
10 G	Whit Sund. Def. of the Holy Ghost.	0 55	8 1
11 M	Monday St. BARNABAS A. M.	1 15	8 49
12 Tu	Tuesday.	1 45	9 37
13 W	Ember Week.	2 15	10 29
14 Th	<i>the most Part of this Month;</i>	2 57	11 20
15 F	<i>but if it happens to be otherwise,</i>	☾ Rises	Morn.
16 S	Day 16 hours 44 min. long.	8 A 40	0 11
17 G	Trinity Sunday.	9 15	1 0
18 M	Craf. Trin. 1 Return.	9 45	1 47
19 Tu	<i>we have Room to hope for better,</i>	10 13	2 31
20 W	Transl. of Edw. K. of West Sax.	10 36	3 17
21 Th	☉ in ☿ 32 min. past 9 Morn.	10 57	4 2
22 F	K. GEORGE II. Inaug. Term begins.	11 15	4 41
23 S	<i>in the next.</i> Fast.	11 40	5 24
24 G	1 S. after T. Nat. of St. JOHN Bap.	11 59	6 5
25 M	Oct. Trin. 2 Return	Morn.	6 49
26 Tu	K. GEORGE II. proclaim'd 1727.	0 25	7 40
27 W	Day 16 hours 44 min. long.	0 57	8 29
28 Th	<i>As good Weather now, and to the (Fast</i>	1 33	9 21
29 F	St. PETER Ap. and Mart.	2 21	10 19
30 S	<i>End, as we can expect this Month.</i>	☾ Sets	11 21

M D	☉ Rises	☉ Sets	☿ Sets	♄ Sets	♂ Rises	♀ Sets	♂ Rises	W. fast.
1	3 48	8 12	9 A 46	10 A 40	1 M 31	9 A 33	1 M 15	2 50
6	3 45	8 15	9 23	10 23	1 18	8 22	2 4	4 10
11	3 42	8 18	9 0	10 6	1 4	Rises	2 57	5 30
16	3 38	8 22	8 38	9 50	0 49	3 M 20	2 52	5 52
21	3 32	8 28	8 16	9 32	0 34	2 57	2 54	5 50
26	3 38	8 22	Sets	9 13	0 19	2 37	3 5	5 10

JULY hath xxxi Days.

M | Moon's
D | place

New Moon	1 Day 16 min. past 1 in the Morn.	1	15 ⁵⁵ 53
First Quarter	7 Day 32 min. past 3 in the Aftern.	6	29 ⁴⁴ 42
Full Moon	15 Day 23 min. past 9 in the Morn.	11	5 ²³ 23
Last Quarter	23 Day 26 min. past Noon.	16	6 ⁴⁴ 4
New Moon	30 Day 5 min. past 8 in the Morn.	21	5 ³⁷ 37
		26	10 ¹¹ 14

1 ^S	2 Sunday after Trinity. [3 Ret	8 A 41	0 A 43
2 ^M	Visit. of the B. V. Mary. Qu. Trin.	9 6	1 22
3 ^{Tu}	☉ due E 7 ho. 14. min. Alt. 29°. 27	9 33	2 21
4 ^W	Transf. of S. Mart. B. and C.	10 1	3 18
5 Th	Old Midsummer Day.	10 26	4 12
6 ^F	Days decreas'd 18 minutes.	10 53	5 3
7 ^S	☉ho. a Becket.	11 18	5 54
8 ^G	3 Sunday after Trinity.	1 47	6 43
9 ^M	Tres. Trin. 4 Return.	Morn.	7 32
10 ^{Tu}	Old St. Peter's Day.	0 15	8 22
11 ^W	Term ends.	0 49	9 11
12 Th	Day 16 hours 20 minutes long	1 35	10 3
13 ^F	Brisk cooling Breezes of Wind	2 27	10 54
14 ^S	(perhaps) accompanied with	3 16	11 40
15 ^G	4 Sunday after Trinity. Within	D Rises	Morn.
16 ^M	Days decreas'd 35 minutes	8 A 9	0 25
17 ^{Tu}	moderate Showers; but (we hope)	8 35	1 9
18 ^W	not unseasonable for the	8 57	1 52
19 Th	Harvest, now nor at any other	9 17	2 35
20 ^F	Marg. V. & M. Antioch	9 37	3 17
21 ^S	Pr. CARO. MATILDA bo. the 22d.	9 56	4 1
22 ^G	5 Sunday after Trinity. Magda.	10 21	4 42
23 ^M	Now real Night, ☉ at Midni. being	10 51	5 31
24 ^{Tu}	more than 18°. below the Horizon	11 19	6 15
25 ^W	St. JAMES Ap. and Mart. [Fast.	Morn.	7 10
26 Th	St. Anne Moth. to the B. V. Mary.	0 5	8 5
27 ^F	☉ rising and setting Amplit. 33°.	0 55	9 1
28 ^S	Days shorten'd 1 hour 5 min.	1 56	10 3
29 ^G	6 Sunday after Trinity.	3 11	11 4
30 ^M	time to the End of this Month.	D Sets	0 A 6
31 ^{Tu}	Dog-days begin	8 A 1	1 1

M D	☉ Rises	☉ Sets	☿ Sets	♃ Sets	♂ Rises	♀ Rises	♂ Rises	W:tan
1	3	42 8	18 3	M 24	8 A 59	0 M	5 21	19 3
6	3	46 8	14 3	1	8 43	11 A 49	2 3	Sets. 15
11	3	50 8	20 3	39	8 25	11 33	1 49	8 A 46
16	3	55 8	05 2	17	8 7	11 19	1 35	3 50
21	4	1 7	59 1	55	Rises 11	5 1	24 8	48 5
26	4	9 7	51 1	34	3 M 47	10 52	1 15	3 43

fast.
50
10
30
52
50
30

AUGUST hath xxxi Days.

[M] Moon's
[D] place

First Quarter 6 Day 19 min. before 1 in the Morn. 1 10 3
Full Moon 14 Day 25 min. before 1 in the Morn. 6 19 41
Last Quarter 21 Day 47 min. past 11 at Night. 17 21 13
New Moon 28 Day 20 min. past 3 in the Aftern. 16 20 38
21 22 24
26 29 45

1 W	Lammas Day.	8 A 27	1 A 59
2 Th	Days are now decreas'd, and	8 53	2 53
3 F	Nights lengthen'd 1 ho. 25 min.	9 21	3 45
4 S	☉ due East 6h. 53 m. Alt. 22° 2'.	9 47	4 34
5 G	7 Sunday after Trinity.	10 17	5 27
6 M	Transfig. of our Lord.	10 55	6 17
7 Tu	Name of Jesus.	11 34	7 9
8 W	Brisk Winds with	Morn.	7 59
9 Th	Thunder, &c. &c.	0 21	8 47
10 F	St. Laur. Arch. D. of R. & M.	1 17	9 35
11 S	Prs. AUGUSTA born	2 7	10 23
12 G	8 Sunday after Trinity. Old Lamas	3 9	11 9
13 M	Foggy Mornings, followed	☾ Rises	11 53
14 Tu	with fine seasonable Weather	7 A 7	Morn.
15 W	for the Harvest, may reasonably	7 27	0 37
16 Th	Day 14 hours 26 min. long.	7 47	1 19
17 F	☉ due E 6 h. 41'. Alt. 12° 37'.	8 9	2 1
18 S	☉ Amplitude North 17°.	8 35	2 45
19 G	9 Sunday after Trinity.	8 57	3 31
20 M	be expected except, Thunder	9 30	4 15
21 Tu	Day decreas'd 2 hours 3 quarters	10 7	5 7
22 W	Storms, and too much	10 45	5 57
23 Th	Wet, now, and so to Fast.	11 44	6 50
24 F	St. BARTHOLOMEW Ap. & Mart.	Morn.	7 49
25 S	continue to the End	0 53	8 47
26 G	10 Sunday after Trinity.	2 5	9 49
27 M	of this Month or thereabout.	3 21	10 47
28 Tu	S. Au. B. of Hip. C. D.	☾ Sets	11 45
29 W	Beheading of JOHN Bap.	7 A 1	0 A 41
30 Th	☉ due E. 6h. 30'. Alt. 12. 27.	7 31	1 40
31 F	Day 13 ho. 50 min. long.	7 55	2 33

M.D.	☉ Rises	☉ Sets	☾ Sets	☿ Rises	♂ Rises	♀ Rises	☾ Sets	W. fast
1	4 17	7 45	1 M 9	3 M 31	10 A 36	1 M 7	8 A 29	4 45
6	4 27	7 33	0 49	3 18	10 23	1 2	8 17	3 34
11	4 36	7 24	0 29	3 4	10 10	1 0	8 1	2 32
16	4 47	7 13	0 8	2 52	9 58	1 1	7 44	0 35
21	4 55	7 0	11 A 46	2 39	9 45	1 1	7 25	Slow.
26	5 05	6 55	11 27	2 25	9 32	1 5	7 0	2 15

SEPTEMBER hath xxx Days.

M. D. place

First Quarter 4 Day 10 min. past 1 in the Aftern.	1	1m 56
Full Moon 12 Day 36 min. past 4 in the Aftern.	6	6 7
Last Quarter 20 Day 18 min. past 9 in the Morn.	11	5 44
New Moon 27 Day 51 min. before 1 in the Morn.	16	6 38
	21	13 51
	26	16 39

1 S	Giles Abbot and Conf.	8 A 25	3 A 23
2 G	11 Sunday after Trinity.	9 2	4 17
3 M	☉ Amplitude North 13 degrees	9 41	5 6
4 Tu	Old Bartholomew Day	10 21	6 6
5 W	Days decreas'd, and Nights now	11 15	6 51
6 Th	increas'd 2 hours 27 minutes	Morn.	7 31
7 F	Dog. days end Enurchus B.	0 11	8 27
8 S	Nativity of the blessed Virgin Mary	1 11	9 14
9 G	12 Sunday after Trinity.	2 13	9 59
10 M	Foggy Mornings, but	3 15	10 43
11 Tu	Day 12 hours 3 quarters long	4 19	11 27
12 W	<i>tolerable good Weather for the Harvest</i>	Rises	Morn.
13 Th	LONDON burnt A. D. 1666.	6 A 21	0 11
14 F	Holy Cross Day.	6 47	0 51
15 S	☉ due E. 6h. 7 min. Alt. 3°. 20'	7 11	1 38
16 G	13 Sunday after Trinity.	7 35	2 23
17 M	Days are now shorten'd and	8 14	3 11
18 Tu	Nights lenthen'd 4 hours 20 min.	8 59	4 3
19 W	Ember Week.	9 43	4 55
20 Th	Equal Day and Night in all Fast	10 53	5 49
21 F	St. MATTHEW Ap. Ev. & Mart.	11 51	6 45
22 S	☉ in ☾ 54 min. past 10 at Night.	Morn.	7 41
23 G	14 Sunday after Trinity.	1 3	8 41
24 M	the habitable Parts of the Earth.	2 19	9 35
25 Tu	A fine Season for the	3 47	10 31
26 W	S. Cyprian Arch. of Carth. & M.	Sets	11 27
27 Th	Day 11 hours 40 min. long.	6 00	A 24
28 F	<i>latter end of the Corn Harvest.</i>	6 31	1 19
29 S	St. MICHAEL, and all Angels.	7 15	2 11
30 G	15 Sunday after Trinity.	7 43	3 7

M D	☉ Rise	☉ Set	☾ Sets	☿ Rises	♂ Rises	♀ Rises	☿ Sets	W. flow.
1	5	16 6	44	11 A 5	2 M 12	9 A 17	1 M 13	6 A 39 3 48
6	5	26 6	34	10 47	1 59	9 3	1 20	6 16 4 19
11	5	37 6	23	10 29	1 46	8 50	1 30	Rises 4 45
16	5	47 6	13	10 11	1 34	8 36	1 41	M 44 5 6
21	6	6 6	6	9 54	1 21	8 31	1 55	4 21 6 50
26	6	10 5	50	9 37	1 9	8 52	2 54	22 8 30

OCTOBER hath xxxi Days.

M D Moon's place

First Quarter 4 Day 22 min. past 5 in the Morn.
Full Moon 12 Day 56 min. past 8 in the Morn.
Last Quarter 19 Day 10 min. past 5 in the Aftern.
New Moon 26 Day 49 min. past 10 in the Morn.

1 6 58
6 8 33
11 8 30
16 12 30
21 21 30
26 4 2

1 M Days decreas'd 5 hours 20 min.
2 Tu fair at Botting. Old St. MAT
3 W still expect a fine
4 Th seasonable Time for gathering in
5 F Days 11 hours long.
6 S Faith. Virgin and Mart.
7 G 16 Sunday after Trinity.
8 M the Remainder of the Harvest.
9 Tu St. Denys Arcop. B. and M.
10 W Old Michaelmas Day.
11 Th Days decreas'd 6 ho. 3 minutes.
12 F Now (perhaps) Frosty Mornings,
13 S Transl. of K. Ed. Conf.
14 G 17 Sunday after Trinity.
15 M but (hope for, a good Season.
16 Tu Day 10 ho. 22 min. long.
17 W Etheldred, Virg.
18 Th St. LUKE the Evangelist.
19 F for the Seed Time
20 S
21 G 18 Sunday after Trinity.
22 M K. GEORGE II. Crown'd 1727.
23 Tu
24 W Days shorten'd 7 hours
25 Th Crispin Mart.
26 F ☉ Eclips'd visible.
27 S Fast.
28 G 19 S. aft. Tr. St. SIMON & St. JUDE
29 M Old St. LUKE. [Ap. & M.
30 Tu Day 9 hours 36 min. long.
31 W Fast.

8A 27 4A 1
9 15 4 54
10 12 5 43
11 11 6 33
Morn. 7 20
0 11 8 3
1 19 8 49
2 19 9 31
3 25 10 14
4 21 10 59
D Rises 11 43
5 A 27 Morn.
5 51 0 31
6 27 1 17
7 4 2 7
7 50 2 59
8 45 3 55
9 49 4 49
11 3 5 45
Morn. 6 41
0 21 7 37
1 41 8 31
2 57 9 23
4 19 10 17
D Sets 11 10
5 A 5 0 A 2
6 25 0 57
7 11 1 51
8 4 2 45
8 30 3 37
9 1 4 27

ML	☉ Rises	☉ Sets	☾ Rises	☾ Sets	☽ Rises	☽ Sets	☽ Rises	☽ Sets	W. flow.
1	5	18 5	42 9A	20 0M	56 7	A 48	2 M	20 4	M 39 10 30
6	5	31 5	29 9	2 0	43 7	30 2	33 5	7 12	0
11	5	39 5	21 8	4 0	28 7	11 2	48 5	38 13	19
16	5	49 5	11 8	28 0	12 6	50 3	02 6	9 14	25
21	7	0 5	0 8	11 11A	55 5	27 3	17 6	42 15	17
26	7	9 4	51 7	52 11	35 6	3 3	32 1	Sets 15	5

NOVEMBER hath xxx Days.

M	Moon
D	place

First Quarter 3 Day 24 min. before 1 in the Morn.	1 21 34
Full Moon 11 Day 46 min. before 1 in the Morn.	6 22 17
Last Quarter 18 Day 32 min. before 1 in the Morn.	11 25 24
New Moon 25 Day 57 min. before 1 in the Morn.	16 04 32
	21 15 5
	26 22 46

1 Th	All Saints Day.	10 A 5	5 A 13
2 F	Prs. of ORANGE born	11 7	6 3
3 S	Craft. Anim. 1 Return.	Morn.	6 47
4 G	20 Sunday after Trinity.	0 9	7 31
5 M	Papists Conspira.	1 11	8 15
6 Tu	Leonard, Confessor. Mich. T. beg.	2 15	8 57
7 W	Day 9 hours 19 minutes long.	3 24	9 39
8 Th	We need not be very [Old St. S. JUDE	4 39	10 23
9 F	curious with Regard to the Weather,	5 35	11 13
10 S	King George II. born. 1683.	D Rises	Morn.
11 G	21 Sund. aft. Trin. Martin Bish. & C.	4 A 58	0 3
12 M	Craft. Mart. 2 Return. Old All Saints	5 47	0 54
13 Tu	Britius Bish.	6 39	1 50
14 W	in this Month of November, for it is	7 41	2 45
15 Th	Machutus Bishop.	8 49	3 40
16 F	Day 8 hours 20 minutes long.	10 2	4 36
17 S	Hugh, Bish. of Linc.	11 27	5 31
18 G	22 Sunday after Trinity.	Morn.	6 22
19 M	Octab. Mart. 3 Return	0 44	7 17
20 Tu	Edm. B. and Mart.	2 1	8 9
21 W	Days decreas'd 8 hours and an half.	3 29	9 C
22 Th	Cecilia, M. and M. Old Martin.	4 31	9 51
23 F	S. Clem. I. B. of B. and M.	5 45	10 42
24 S	Prince WILL. HEN. born the 25.	D Sets	11 37
25 G	23 Sunday after Trinity. Cath. M.	4 A 57	0 A 31
26 M	Quin. Mart. 4 Return.	5 47	1 23
27 Tu	Day 7 hours 50 minutes long.	6 41	2 15
28 W	Michaelmas Term ends.	7 40	3 3
29 Th	or soon will be Winter in earnest. Fast	8 47	3 49
30 F	St. AND. Ap. Prs. Dow. of W. bo	9 49	4 37

M D	☉ Rises	☉ Sets	☿ Sets	♄ Rises	♂ Rises	♀ Rises	♂ Rises	W. flow.
1	7 21	4 39	7 A 32	11 A 19	5 A 35	3 M 49	Sets.	16 15
6	7 31	4 29	7 14	11 10	5 8	4 44	A 45	16 2
11	7 40	4 20	6 56	10 42	4 41	4 18	4 42	15 32
16	7 48	4 12	6 37	10 25	Sets	4 33	4 41	14 43
21	7 56	4 04	6 19	10 6	7 M 20	4 46	4 42	13 33
26	8 05	3 55	6 C 9	9 45	6 50	5 04	4 48	12 2

MI Moon's
D place

1	24	22
6	24	33
11	25	47
16	13	49
21	12	18
26	26	13

1	S	Days 7 hours 42 minutes long.	10	A	51	5	A	19
2	G	Advent Sunday.	11		55	5		59
3	M	Short cold Days, with		Morn.		6		44
4	Tu	bad dirty Roads, make	1		5	7		27
5	W	few chuse to travel far from	2		7	8		9
6	Th	Nicol. Bish. of Myra in Licia.	3		2	8		55
7	F	Days decreas'd 9 hours 12 min.	4		19	9		41
8	S	Concept. of the B. V. M.	5		25	10		33
9	G	2 Sunday in Advent.	6		29	11		30
10	M	home; nor indeed we do not		D Rises			Morn.	
11	Tu	Old St. Andrew.	5	A	27	0		25
12	W	Day 7 hours 32 minutes long.	6		30	1		21
13	Th	Luce Virgin and Mart.	7		45	2		18
14	F	think it adviseable (except)	8		50	3		19
15	S	Days decreas'd, 9 hours 25 min.	10		15	4		10
16	G	3 Sunday in Advent. D Sapientia.	11		37	5		2
17	M	in cases of necessity &c. to the End.		Morn.		5		50
18	T.		0		52	6		44
19	W	Ember Week.	2		7	7		37
20	Th	Day 7 hours 16 minutes long. Fast	3		21	8		25
21	F	St THOMAS Apostle and Martyr.	4		33	9		15
22	S	☉ in w st 21 D. 28 min. past 10 at	5		37	10		6
23	G	4 Sunday in Advent. [Night]	6		41	11		1
24	M	Greatest Dec. of Days 9h.25 m. Fast		D Sets		11		53
25	Tu	Christmas Day.	5		19	0	A	44
26	W	St. STEPHEN I. Martyr.	6		21	1		31
27	Th	St. JOHN Ap. and Evangelist.	7		21	2		17
28	F	Innocents Day, Herod's Murd. Infa.	8		25	3		2
29	S	Days increas'd 2 min.	9		29	3		41
30	G	1 Sunday after Christmas.	10		30	4		23
31	M	Silvester. Bishop of Rome.	11		34	5		7

M D	♂ Rifles	♂ Sets	♂ Sets	♂ Rifles	♂ Sets	♀ Rifles	♀ Sets	W. flow.							
1	8	93	51	5	A 41	9	A 27	6 M 21	5 M	14	4	A 54	10	14	
6	8	143	46	5	22	9	6	5	54	5	28	5	2	8	10
11	8	183	42	5	3	8	43	5	29	5	42	5	8	5	54
16	8	213	39	4	43	3	19	5	5	5	55	5	0	3	30
21	8	223	38	4	24	7	57	4	41	6	8	4	34	1	30
26	8	233	39	4	4	7	32	4	20	6	20	3	52	1	20

A TABLE of all the Kings and Queens of England since the Conquest.

The Year of the Birth of each King and Queen; also the Year, Month, and Day, whereon they began to reign: beginning the Year the first Day of January, 1753.

The Length of each Reign.

The Years expired since each Reign began and ended.

Names.	Born.	Began to Reign.	Y. M. D.	Beg.	End
William Conq.	1027	1066 October 14	20 10 26	687	666
William Rufus	1057	1087 Septem. 9	12 10 24	666	653
Henry I.	1058	1100 August 2	35 4 c	653	618
Stephen	1105	1135 Decem. 1	18 10 24	618	599
Henry II.	1134	1154 October 25	34 8 11	599	564
Richard I.	1156	1189 July 6	9 9 c	564	554
John	1166	1199 April 6	17 6 13	554	537
Henry III.	1207	1216 October 19	56 1 c	537	481
Edward I.	1239	1272 Novem. 16	34 7 21	481	446
Edward II.	1284	1307 July 7	19 6 13	446	426
Edward III.	1312	1327 January 20	50 5 1	426	376
Richard II.	1366	1377 June 21	22 3 8	376	354
Henry IV.	1367	1399 Septem. 29	13 5 21	354	340
Henry V.	1389	1413 March 20	9 5 11	340	331
Henry VI.	1421	1422 August 31	38 6 4	331	292
Edward IV.	1442	1461 March 4	22 1 5	292	270
Edward V.	1471	1483 April 9	0 2 13	270	270
Richard III.	1443	1483 June 22	2 2 0	270	268
Henry VII.	1457	1485 August 22	23 8 c	268	244
Henry VIII.	1492	1509 April 22	37 9 6	244	206
Edward VI.	1537	1547 January 28	6 5 8	206	200
Mary I.	1516	1553 July 6	5 4 11	200	195
Elizabeth	1533	1558 Novem. 17	44 4 7	195	150
James I.	1566	1603 March 24	22 0 3	150	128
Charles I.	1600	1625 March 27	23 10 3	128	104
Charles II.	1630	1649 January 30	36 0 7	104	68
James II.	1633	1685 February 6	4 0 7	68	64
Mary II.	1662	1689 Feb. 13	5 10 15	64	59
William III.	1650		13 0 23	64	51
Anne	1665	1702 March 8	12 4 24	51	39
George I.	1660	1714 August 1	12 10 10	39	26
George II.	1683	1727 June 11	whom God preserve.		

A Compendious TABLE OF INTEREST,
 Shewing the Interest of any Sum of Money, from a Million
 to a Pound; for any Number of Days, at any Rate of
 Interest.

N ^o .	l.	s.	d.	q.	N ^o .	l.	s.	d.	q.
1000000—	2739	14	6	0,99	1000—	2	14	9	2,14
900000—	2465	15	0	3,29	900—	2	9	3	3,12
800000—	2191	15	7	1,59	800—	2	3	10	0,11
700000—	1917	16	1	3,89	700—	1	18	4	1,10
600000—	1643	16	8	2,19	600—	1	12	10	2,80
500000—	1369	17	3	0,49	500—	1	7	5	3,70
400000—	1095	17	9	2,79	400—	1	1	11	0,50
300000—	821	18	4	1,09	300—	0	16	5	1,40
200000—	547	18	10	3,40	200—	0	10	11	2,30
100000—	273	19	5	1,70	100—	0	5	5	3,01
90000—	246	11	6	0,32	90—	0	4	11	0,71
80000—	219	3	6	0,96	80—	0	4	4	2,41
70000—	191	15	7	1,59	70—	0	3	10	0,11
60000—	164	7	8	0,22	60—	0	3	3	1,81
50000—	136	19	8	2,85	50—	0	2	8	3,51
40000—	109	11	9	1,48	40—	0	2	2	1,21
30000—	84	3	10	0,11	30—	0	1	7	0,90
20000—	54	15	10	2,74	20—	0	1	1	0,60
10000—	27	7	11	1,37	10—	0	0	6	2,30
9000—	24	13	1	3,23	9—	0	0	5	3,67
8000—	21	18	4	1,10	8—	0	0	5	1,40
7000—	19	3	6	2,96	7—	0	0	4	2,41
6000—	16	8	9	0,82	6—	0	0	3	3,76
5000—	13	13	11	2,58	5—	0	0	3	1,15
4000—	10	19	2	0,55	4—	0	0	2	2,52
3000—	8	4	4	2,41	3—	0	0	1	3,80
2000—	5	9	7	0,27	2—	0	0	1	1,26
1000—	2	14	9	2,14	1—	0	0	0	2,63

R U L E.

Multiply the Sum by the Number of Days; and that Product by the Rate per Cent. Then cut off the two last Figures to the right Hand, and the rest you must find in the Table.

Example, What is the Interest of 100 l. for 365 Days at 5 per Cent.

N^o. of Days 365

multiply by 100

Product 36500

multiply by 5 Rate p. Cent.

182500

Then in the Table

against 1000 is 2 14 9 2,14

1800 2 3 10 0,11

20 0 1 1 0,60

5 0 0 3 1,15

Ans^r. 5 0 0 0 00

Of the Eclipses in the Year 1753. 17

FOUR Eclipses will be
In the Year Fifty three;
In what Order they'll stand,
You will find here at hand.

Hollingsworth.

The First is a Lunar Eclipse; it happens the 6th of *April* O. S. or 17th N. S. at 6 o' Clock in the Evening, visible to the *European* Part of the World; the Result of which, from *Leadbetter's* System, stands as followeth:

Equ. Time of true 8.	Long. ☉ S ° ' "	Anom. ☉ S ° ' "	Long. ☾ S ° ' "	Anom. ☾ S ° ' "	Node ☾ S ° ' "
An ^o 1753.	9 21 07 25	6 12 28 16	0 14 36 36	2 20 17 58	7 11 36 42
April 17.	3 04 37 20	3 04 37 04	6 04 56 02	6 04 14 20	0 05 05 01
Hours 6	14 47	14 47	03 17 39	3 15 59	48
Minutes 11	27	27	06 02	05 59	01
Seconds 32	01	01	17	17	0
mean Mot.	0 26 00 00	9 17 20 35	6 22 56 36	8 17 54 23	05 05 50
Equa. add	01 50 19	Equat. add	4 53 43		7 06 30 51
☉'s Place	0 27 50 19	☾'s Place in her Orb	6 27 50 19	Hourly Mot.	☉ 2 26 ☾ 34 22
North Node subtract			7 06 30 51	Hourly Mot.	☉ 2 26 ☾ 34 22
Argument of Lat.			11 21 19 28	Hourly Mot.	☉ 2 26 ☾ 34 22
Hence ☾'s Lat. S. D.			45 11	☾ from ☉	31 56
and Reduction			1 57		
Time of Reduction			3 39		

Equal Time of the true Orbit 8 at *London* 1753. Apr. 17, 6 11 32
Time of Reduction subtract and add 3 39

Equal Time of the { Ecliptic 8 6 07 53
Middle 6 15 11
Equation of Time add 18

Apparent Time of the { Ecliptic 8 17 6 08 31
Middle 6 15 49

Horizontal Parallax of the { Sun 0 10
Moon 58 31

Sum 16 00

Semidiameter of the ☉ sub. 42 41

Apparent Diam. of ☉ shadow 0 15 52

☾'s Semidiameter add 0 58 33

Sum 0 45 11

☾'s true Latitude sub. 0 13 32

Rest Parts deficient 5 03 00

B.

For

18 Of the Eclipses in the Year 1753.

For the Scruples of Incidence.

Sum of Semidiams. of ☉ and ☾ 58' 41" — D's Latitude 45' 11"

60	60
3521	2711
2711	

Sum 6232 } Log. { 3.793930
Difference 810 } { 2.008485

Sum of Logarithms 6.702415

Half = Log. of 2245 = 3.351307 = 37' 35"

Hence the Time of Incidence = 70 16

From which Calculation the apparent Time of the Eclipse happens as follows

	London	Sapperton	Naples
	h. ' "	h. ' "	
Beginning April 17.	5 05 33	4 57 03	6 05 33
Ecliptic 8	6 08 31	6 00 01	7 08 31
Middle	6 15 49	6 07 19	7 15 49
End	7 26 05	7 17 35	8 26 05
Total Duration		2 20 32	
Digits eclipsed		5 03 00	

The Second is a Solar Eclipse; it happens the 3d of May, at Half an Hour after Seven in the Morning, invisible.

The Third is a Lunar Defect, at Ten in the Morning, on the 12th of October, invisible.

The Fourth and last Eclipse is of the Sun, at Ten in the Morning, on the 26th Day of October, visible; a Calculation of which follows for the Meridian and Latitude of

London	Long. ☉	Anom. ☉	Long. ☾	Anom. ☾	D's Node
Equ. Th. 6	S ° ' "	S ° ' "	S ° ' "	S ° ' "	S ° ' "
1753	9 21 07 25	6 12 28 16	0 14 36 36	2 20 17 58	7 11 36 4
Ob. 14 O. S.	9 12 52 49	9 12 52 02	6 01 37 31	4 29 39 04	15 11 5
Hours 22	54 13	54 13	12 04 42	11 58 34	2 5
Minutes 44	1 43	1 43	23 03	22 52	0
Seconds 02	0	0	01	01	0
Mean Motio.	7 04 56 11	3 26 16 14	6 28 41 53	8 02 18 29	15 14 5
Equat. sub.	— 1 45 18	Equat. add	+ 4 29 00		6 26 21 5
Sun's Place	7 03 10 53	D in her Orb	= 7 3 10 53		
		North Node sub.	6 26 21 51	Hor. Para. ☾ from ☉	59 15
		Argument of Lat.	0 06 49 02	Hourly Motion { ☾	35 18
		D's true Latitude N. A.	35 34	Hourly Mot. ☾ fr. ☉	23 18
		Reduction sub. &c.	1 32	Semidiam. { ☉	16 5
		Time of Reduction	2 47	{ ☾	16 0

Sum of the Semidiameters 31

Of the Eclipses in the Year 1753.

19

The middle Time of the true $\odot$ in the D's Orb 1753.	h. 22 42 02
October 23, N. S. _____	
Equation of Time add _____	0 15 56
Apparent Time $\odot$ in D's Orb _____	22 57 58
Time of Reduction sub. and add. _____	0 2 47
Apparent Time of the nearest Approach to Centre _____	0 55 11
Apparent Time of the Ecliptic $\odot$ _____	23 00 45
Sun's Place then _____	m 3 11 00
Sun's Right Ascension _____	210 57 20
Apparent Time from Noon _____	345 11 15
Right Ascension Medium Caeli — 360° _____	196 08 35
Remainder — 180° _____	16 08 35
Medium Caeli in Ecliptic. _____	17 30 55
Meridian Angle _____	67 29 40
Declin. Culminating Point South _____	6 53 16
Altitude of Equator at London _____	38 28 00
Altitude Midheaven _____	31 34 44
Alt. Nonagesime Degree _____	38 06 05
Place of Nonagesime Degree _____	15 36 18
Dist. $\odot$ or D from Nonagesime Degree _____	47 34 42
Parallax in Long. D _____	26 59
Parallax in Lat. D _____	46 36
True Lat. D N. A. _____	35 34
Visible Lat. S. A. _____	11 02

For the Med. Caeli in Ecliptic Trigonometrically

As Rad. _____	10.000000
to Cosine Obliquity _____ 23° 29' _____	9.962453
so Cor. R. A. Med. Caeli 16 08 35" _____	10.538427
to Cot. Dist. from _____ 17 13 55 _____	10.500820

For Meridian Angle

As Rad. _____	10.000000
to Sine of Obliquity _____ 23° 29' 00" _____	9.600409
so is Cosine R. A. M. C. 16 08 35 _____	9.982529
to Cosine Meridian Angle 67 29 40 _____	9.582938

For Declin. Culminating Point

As Rad. _____	10.000000
to Tang. Obli. _____ 23° 29' 00" _____	9.637956
so is Sine R. A. M. C. 16 08 35 _____	9.444102
to Tang. Decl. Culmin. Point 6 53 16 _____	9.081058

For the Altitude of the Nonag. Degree

As Rad. _____	10.000000
to Sine Meridian Angle 67° 29' 40" _____	9.965531
so is Cosine Alt. Midheaven 31 34 44 _____	9.930399
to Cosine Alt. Nonag. Degree 38 06 05 _____	9.895930

26 The Eclipses in the Year 1753.

For Place of Nonag. Degree

As Radius		10.000000
To Center Alt. Midheaven	31° 34' 44"	10.211339
So is Center Meridian Angle	67 29 40	9.582938
To Tang. Dist. from Nonag.	31 54 37	9.794177
		S 0 1 "
Place of Midheaven		6 17 30 55
Sub. Dist. last found		1 01 54 37
Rems Place of Nonag. Degree		5 15 36 18
Nonag. Degree 15° 36' 18" Comp.		14 23 42
+ ☉		30 00 00
+ ☉ in M		3 11 00
Sum = Distance ☉ from Nonag. Degree		47 34 42

For the Moon's Parallax in Longitude.

Horizontal Parallax	59' 13" + Rad.	10.0057
Sine Alt Nonag	38° 06' 05	9.7903
Sine Dist. ☉ from Nonag. Degree	47° 34' 42"	9.8682
To Parallax in Long.	26 59	3472

For the Moon's Parallax in Latitude.

Horizontal Parallax	59' 13" + Rad.	10.0057
Cohne Alt. Nonag.	38° 06' 05	9.8959
Parallax in Lat.	46 36	1098

To the Nonag. Degree 15° 36' 18" add three Signs, the Ascendant is 15° 36' 18", whence the Luminaries are between the Ascendant and Nonag. Degree the visible Eclipse happens before the true, also the Eclipse falls in the Oriental Quadrant.

And by repeating the Trigonometrical Calculation, I find the D's Parallax in Latitude at one Hour before the Ecliptic ☉ 42' 49".

at { 23^h 00' 45" } D's Parallax in Long. { 26' 59"

{ 22 00 45 } { 35 05

Diff. 1 00 00 Decreased 8 06

True Hourly Motion of D from ☉ 33 03

Visible hourly Motion 24 57

Hence the Interval of Time is 1^h 4' 53" wherefore { 23^h 00' 45"

from the Time of the Ecliptic Conjunction { 1 04 53

Subtract the Interval of Time 21 55 52

Rems Ap. Time vis. ☉ 1753, October 25th

And by repeating the Operation I find D's Par. Long. 35' 41"

Par. in Lat. 42' 30" and her true Lat. N. A. 32 12

Hence her visible Lat. S. 10 18

Semidiameter ☉ and D 32 19

Sub. — Parts deficient 22 01

Digits eclipsed 8 09 00

And

And at one Hour before visible	55	32
Diff. of Parallax in Long. from Middle of Eclipse	1	38
Visible Hourly Motion from Middle of Eclipse	1	38
Parallax in Latitude	1	38
At one Hour after visible	55	32
Diff. of Parallax in this Hour	1	38
Whence visible Hourly Motion from Middle of Eclipse	1	38
Parallax in Latitude	1	38
Hence visible & is 1753	55	32
Time from Middle to visible	1	38
Middle of the Eclipse	53	34
Scruples of Incidence	50	38
Time of Incidence	53	37
Time of Repletion	53	38

The same ingenious Correspondent improved us with a Calculation of the same Eclipse for the Lat. and Meridian of the City of Rome, which, for want of Room, must be omitted.

We have also received an Account of the Time, Place, &c. of the said Eclipses from several other of our ingenious Correspondents, exhibited in the following Table.

Moon Eclipsed April 17, 1753	Reg.	Mid.	End.	Dist.	Dig.
apparent Time.	h. m.	h. m.	h. m.	h. m.	° m.
Harland Widd, Whitby	4 34	6 4	7 14	2 20	5 2
Geo. Godhelp, Lincoln	5 47	6 38	7 50	2 23	5 33
Mr. Abr. Lord for par Landbertes	5 22	6 22	7 31	2 18	4 59
Peckleton in Leic- { Sherburcy	4 49	6 15	7 40	2 51	6 45
estershire { Hymton	4 55	6 12	7 23	2 23	5 54
Mr. W ^m Wadham, North Curry	4 54	6 4	7 14	2 20	5 3
Mr. Rob. Peck- { London	5 7	6 17	7 27	2 20	5 0
ham { Wrotham, Kent	5 9	6 19	7 29	2 20	5 3
Mr. Edw. Greenstead, London	4 59	6 8	7 13	2 20	5 3
Mr. John Skay, London	5 6	6 16	7 26	2 20	5 3
Mr. T. Harbridge, Rowbright Combs	5 4	6 14	7 24	2 20	5 2
Mr. Wm Spencer, Sheffield	5 15	6 27	7 35	2 20	5 4
Mr. Sam. Townsrow, London	5 3	6 20	7 35	2 20	5 14
Mr. James Hogard, Peterborough	4 53	6 3	7 13	2 20	5 6
London	5 7	6 17	7 27	2 20	5 3
Mr. Alex. Rowe { Rome	5 59	7 9	8 19	2 20	5 5
{ Gibraltar	4 42	5 52	7 2	2 20	5 5
{ Barbadoes	1 14	2 24	3 34	2 20	5 5
{ Penzance	4 45	5 55	7 5	2 20	5 5
Mr. John Williams, Mold, Flintshire	4 51	6 8	7 25	2 24	5 50

Sun Ed. Oct. 26 Morn. apt Time	Beg.	Mid.	End	Dur.	Dig.
Harland Widd, Whitby - -	8h 7m	9h 10m	10h 16m	2h 9m	7 ⁴⁸
Mr. Benj. Talbot } by Leadb. London	8 50	10 21	11 14	2 24	8 ¹
Mr. Benj. Talbot } by Machin } London	8 18	9 30	10 41	2 23	
Mr. Benj. Talbot } by Machin } Newport	8 11	9 19	10 29	2 18	
Mr. Geo. Godhelp, Lincoln -	8 23	9 31	10 39	2 16	8 22
Mr. Abr. Lord } Peckleton, Leicest.	9 14	10 28	11 44	2 30	8 25
Mr. Abr. Lord } Napies - -	10 48	12 8	1 31	2 43	9 20
Mr. Wm Wadham, North Curry	8 30	9 39	10 52	2 22	8 35
Mr. Edw. Greensted, London	8 37	9 47	11 0	2 23	8 19
Mr. John Skay, Long Compton	8 45	9 50	11 3	2 18	8 4
Mr. John James, London - -	8 42	9 50	11 3	2 27	7 53
Mr. Wm Spencer, Sheffield -	9 3	10 22	11 33	2 30	7 27
Mr. Samuel Towndrow, London	8 41	9 59	11 18	2 38	8 3
Mr. Alex. Rowe, London - -	8 46	9 58	11 30	2 49	8 11
Mr. John Williams, Mold, Flintsh.	8 38	9 48	10 58	2 20	7 56

Besides these there will be a remarkable Transit of the Planet *Mercury* over the Sun's Disk, on *May 6*, the Times whereof are as follows.

Harland Widd.

May 6th, 1753, Morn.	Beg.	Mid.	End	Dur.	east of Centers.
Harland Widd, Whitby - -	4 14	8 11	12 08	7 54	3m 01"
Mr. Benj. Talbot, Lincoln -	3 25	6 52	10 19	6 54	
Mr. Ab. Lord, Peckleton, Leicest.	2 43	6 34	10 24	7 41	
Mr. Alex. Rowe takes Notice, that the Beginning at London will be about Sun-rise, and the Duration 7 Hours and a Half.					
Mr. J. Hollingworth -	14 50			17 47	

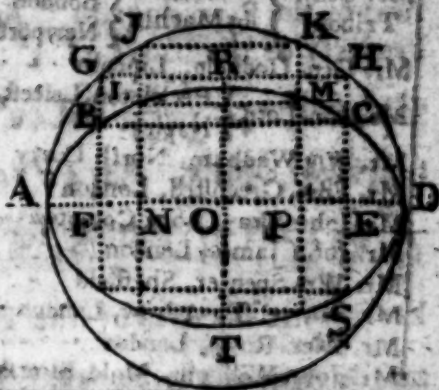
A Table of all the Solar Eclipses that will be visible at *Leicester*, from the Year 1764 till the Year 1817. — *per Abr. Lord.*

Anno Dom.	Beg.	Mid.	End	Dur.	Dig.
1766, Aug. 6th, Afternoon	5h 42m	6h 35m	7h 20m	1h 38m	4 ⁰ 16'
1769, June 4, Morning	6 33	7 27	8 22	1 49	6 32
1772, Octob. 26, Morn.	8 36	8 53	9 25	0 49	0 45
1777, Jan. 9, Aftern.	3 36	4 44	5 49	2 13	9 48
1778, June 24, Aftern.	4 2	4 53	5 37	1 35	4 38
1779, June 14, Morn.	6 32	7 16	8 5	1 33	4 34
1782, April 12, Aftern.	5 26	6 33	7 35	2 9	9 4
1787, Jan. 19, Morn.	9 48	11 10	12 25	2 37	5 6
1787, June 19, Aftern.	4 2	4 55	5 51	1 49	6 9
1788, June 4, Morn.	5 49	6 7	6 42	0 53	1 22
1791, April 3, Aftern.	11 26	1 4	2 33	3 7	9 6
1793, Sept. 5, Noon	10 21	12 0	1 36	3 15	10 49
1794, Jan. 31, Aftern.	11 24	12 23	1 13	1 49	3 34
1797, June 24, Aftern.	10 35	4 17	5 6	1 31	3 01
1802, Aug. 27, Morn.	4 39	5 37	6 35	1 56	5 33
1804, Feb. 10, Morn.	9 41	10 54	12 16	2 35	8 39
1806, June 15, Aftern.	3 54	4 47	5 27	1 38	4 12
1807, Nov. 28, Noon	11 5	12 4	12 57	1 52	3 28
1813, Jan. 31, Morn.	6 43	7 47	8 54	2 11	7 46
1814, July 16, Morn.	5 29	5 44	6 11	0 42	0 44

Answers to the Mathematical Questions in 1752.

(1) Quest. 111. answer'd by Mr. J. Holden.

Let ABLMCD be a Semi-Ellipsis, and AGIKHD its circumscribed Semi-circle, 'tis plain from the Nature of an Ellipsis that the Parallelograms FBCE, NLMP, are proportional to the Parallelograms FGHE, NIKP; and since a Square is the greatest Parallelogram that can be inscribed in a Circle, the Parallelogram FBCE will be the greatest when its Side BC is equal to the Chord of 90 to Radius OD. Therefore calling OD, r , the Area of the half Square FGHE will be r^2 , and because the Areas FBCE and NLMP are to be in the Proportion of 3 to 2; therefore $NP \times PK = \frac{2r^2}{3}$ or $OP \times PK = \frac{r^2}{3}$; from which Equation putting $= 1$ (and because $OP^2 + PH^2 = r^2$) we have $PK = \sqrt{\frac{5}{12}} + \sqrt{\frac{1}{12}} = 0,93417$ and $OP = \sqrt{\frac{5}{12} - \frac{1}{12}} = 0,35682 = PM$: but $PK : PM ::$ the Transverse: the Conjugate :: $.93417 : 0,35682$, and the Product of the Transverse and Conjugate is $= 1752 \times 1,2732 = 2230,7105$, from whence the Transverse $= 76,4205$, and the Conjugate $29,1899$.



The same answer'd by Mr. John Nichols.

Given $a = 1752$, $c = 0,7854$; Let $x = AO$, $y = RO$, $z = OE$. Then $AE = x + z$, and $ED = x - z$, and by the Property of the Curve $x^2 : y^2 :: x^2 - z^2 : \frac{y^2}{x^2} \times x^2 - z^2 = EO^2$.

Whence $\frac{2y}{x} \sqrt{x^2 - z^2} = HS$, and $\frac{4xy}{x} \sqrt{x^2 - z^2} =$ Area of the greatest Parallelogram, a Maximum, and in Fluxions is $\frac{16y^2 x^2 z z - 32y^2 z^2 z}{x^3 \sqrt{16y^2 x^2 z^2 - 16y^2 z^4}} = 0$, whence $z = x \sqrt{\frac{1}{5}}$, and $2x$

24 Questions in last Year's Diary answer'd.

$= x\sqrt{2}$, and by writing $\frac{x^2}{2}$ for a^2 in the Value of HS, we have $y\sqrt{2} = HS$, and $y\sqrt{2} \times x\sqrt{2} = 2yx =$ the Area of the Parallelogram. Again put $u = OP$, and by the Property of the Curve $x^2 : y^2 :: x^2 - u^2 : u^2 :: y^2 x^2 - y^2 u^2 :: v^2 x^2$ and $v^2 = \frac{y^2 x^2}{x^2 - y^2}$ and $4v^2 = \frac{4y^2 x^2}{x^2 - y^2} =$ the Area of the supposed Square, but $4xy c = a^2 : y = \frac{a^2}{4xc}$ and $y^2 = \frac{a^2}{16x^2 c^2}$, and by putting for y and y^2 its Value above, we have $\frac{a^2}{2c} =$ the Area of the Parallelogram, and $\frac{4a^2 x^2}{16x^4 c^2 + a^2} =$ the Area of the Square. Then by the Question 3 : 2 :: $\frac{a^2}{2c} : \frac{4a^2 x^2}{16x^4 c^2 + a^2} :: \frac{a}{c} = \frac{12a^2 x^2}{16x^4 c^2 + a^2}$. This Equation reduced gives $x = \sqrt{\frac{3a + a\sqrt{5}}{8c}} = 38,2102$, and $2x = 76,4204 =$ the Transverse, and $2y = 29,1917 =$ the Conjugate Diameters. *W. W. D.*

The same answer'd by Mr. *Jos. Pilgrim.*

Put $b = 1752$ the given Area of the Ellipsis, whose Diameters AD and RT are to be determined, $c = 3.1459$ the Area of a Circle whose Radius is Unity, $a = OR$ the Semi-Conjugate and $e =$ the Semi Transverse. Then $1 : c :: ae : cae$ the Area of the Ellipsis whence $cae = b$, and $\frac{b}{ca} = e$.

Again suppose the Radius of a Circle, then $\sqrt{0.5aa} =$ half the Side of its inscribed Square. But $a : \frac{b}{ca} :: \sqrt{0.5aa} :$

OE = half the Length of the greatest Parallelogram that can be inscribed in the Ellipsis (as may easily be demonstrated.)

Let $d = \sqrt{0.5}$ Then $\frac{dba}{caa} =$ the same half Length, and $da = RO$ the half Breadth of the Parallelogram. Consequently $\frac{ddb}{c} = \frac{1}{4}$ the Area of the Parallelogram. Again, put $u =$

ON = half the Side of the greatest Square that can be inscribed in the Ellipsis. Then as $\frac{bb}{caa} : aa :: \frac{b-cau}{ca} \times \frac{b+cau}{ca}$

uu (per Conics) whence $\frac{bbccaa}{bbcc+ca^2} = uu = \frac{1}{3}$ of the Area of that Square. But (per Quest.) $3 : 2 :: \frac{ddb}{c} : uu \therefore \frac{b}{c} = \frac{3bbccaa}{bbcc+ca^2}$ and consequently $bb = 3bcaa - cca^2$. Whence by Division, Transposition, and completing the Square $ca = \frac{3b}{2c} - \sqrt{\frac{9bb}{4cc} - \frac{bb}{cc}} = 213.0147$, and $a = 14.5950$. Whence $RT = 29.19$, $AD = 76.4206$, $= EF = 54.0375$. The Parallelograms Breadth 20,6404, and $PN = 27,2685$. Hence the following

RULES.

- 1st As $1 : \sqrt{0.5} ::$ the conjugate Diameter of any Ellipsis : the Breadth of the greatest inscribed Parallelogram. And $::$ Tran. Diameter : the Length of the greatest Parallelogram.
- 2d As 0.785397 : the Area of any Ellipsis : 0.5 : the Area of the greatest Parallelogram that can be inscribed in it.

Many other Persons Names may be seen in the Catalogue, who truly solved this Question.

(2) Quest. 112 by Mr. Cha. Smith.

By the Question the Content of the Glass is $.523598x^3 = x^x (= 1 \times x^x)$; put $n = \frac{1}{0.523598} (= 1.909862)$ then $x^3 = nx^x$, hence $\text{Log. } x \times 3 = \text{Log. } n + \text{Log. } x \times x$, or $\text{Log. } x \times x = \text{Log. } x \times 3 - \text{Log. } n \therefore (x = 3 - \frac{\text{Log. } n}{\text{Log. } x})^3 = \frac{.2810019}{\text{Log. } x} = x$, from this Equation x is greater than 2.15 and less than 2.16; whence (per Sherwin's Tables) x is easily determin'd 2.1596. $\therefore .523598x^3 = 5,2737305$, or $x^x = 5,27373$ exact to 5 Places both Ways. Hence 52,7373 Cubic Inches or $1\frac{3}{4}$ Pints and 2,2068 Inches is the Quantity of Wine drank.

The same answer'd by Mr. Steph. Hartsley.

Let $b = .7854$, then will $\frac{2bx^3}{3} = x^x \therefore \text{Log. } \frac{2bx^3}{3} = \text{Log. } x \times x$, and by a common Table of Logarithms (and your last Year's Diary, p. 31.) x is found 2,1601 Inches, and the Wine drank 1,8274 Pints.

26 Questions in last Year's Diary answered,

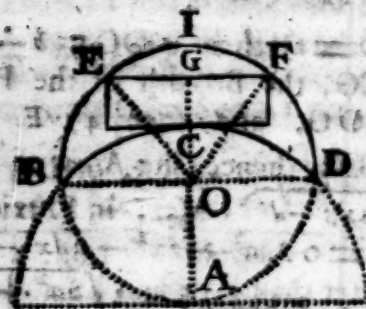
The same answer'd by Mr. Rich. Gibbons.

Put $b = 0,5236$, then by Quest. $bx^3 = xx$, now was $b = 0,5$ then $x = 2$, but as it is a small matter more, suppose $x = 2,1$ its Log. is $0,3222193$, and the Log^m of $bx^3 - x^2$ is equal $0,008997$; and, by taking the Log^m of $2,7 = 0,3424227$, then the Logarithms of $bx^3 - x^2 = 0,0071622$, these two Log^m (and not their natural Numbers) wrought by Trial and Error, give a new Log. of $x = 0,3334703$ and by taking the Log. of $2,16$ for a second Value of x , by Trial as before we get the Log. of $x = 0,3343813$, by which Log. of bx^3 is $0,7221434$ } Consequently x is $2,15964$
and of $-x^2$ is $0,7221433$ }

This Method of working converges faster than any other Method I know of; and is evidently a further Improvement in this useful Doctrine.

This Question was curiously solved by Mr. Jos. Orchard, Writing-master and Teacher of the Mathematics in Gosport, Mr. J. Holden, Mr. Geo. Godhelp, Mr. R. Butler, Mr. Rob. Peckham, Mr. Wm Spencer, Mr. Tho. Garrard, Mr. Tho. Moss, Mr. Wm Kingston, Mr. John Wigglesworth, Mr. John Williams, Mr. Wm Abbott, Mr. Paul Sharp, and many others, as may be seen in the Catalogue.

(3) Quest. 113 answered by Tabularius.



Given $BO = DO = OE = a$, $AC = b$, and $AO = c$; $\therefore OC = b - c = m$; Let $GC = x$, then $GO = m + x$, and per 47 E. 1. $GE = GF = \sqrt{a^2 - m^2 - 2mx - x^2}$, whence $x \sqrt{a^2 - m^2 - 2mx - x^2}$ or $a^2 x^2 - m^2 x^2 - 2mx^3 - x^4$ is a Maximum: in Fluxions $2a^2 x \dot{x} - 2m^2 x \dot{x} - 6mx^2 \dot{x} - 4x^3 \dot{x} = 0$. $\therefore a^2 - m^2 - 3mx - 2x^2 = 0$; whence by Reduct. $x = \sqrt{\frac{a^2}{2} + \frac{m^2}{16}} - \frac{3m}{4}$; and thence the Area is known.

The same answer'd by Mr. Wm Enefer.

It may easily be demonstrated that the Parallelogram required must stand at Right Angles with the Diameter that passes through the Centres of both Circles. It is likewise evident, from the Construction of the Lune, that this Problem admits of three Cases.

For 1st } The Centre of the } within
 2 } outward Circle } without
 3 } may fall } in the Periphery of } the inner one.

In the annex'd Scheme (suited to the 1st Case) let BEIFDCB be the given Lune, EFC the Parallelogram, then we have given by Quest. OB=OE=OF=a, AC=b and OA=c, put GC (the Width of the Parallelogram) = x, then GIa-b+c-x and AG=a+b-c+x. Th. per 35 E. 3. AG x IG = GE² = a² - b² + 2bc - 2bx - c² + 2cx - x². ∴ $x\sqrt{a^2 - b^2 - 2bc - 2bx - c^2 + 2cx + x^2}$ = half the Area of the Parallelogram a Max. in Fluxions $2a^2xx - 2b^2xx + 4bcxx - 6b^2xx - 2c^2xx + 6cxx - 4x^3x = 0$, which Equation being properly ordered gives $x^2 + \frac{3b-3c}{2} x = \frac{a^2 - b^2 + 2bc - c^2}{2}$,

whence by compleating the Square, extracting the Root, and proper Reduction, $x = \frac{3c-3b}{4} + \sqrt{\frac{8a^2 + b^2 - 2bc + c^2}{16}}$ a general Theorem for the 1st and 2^d Cases; and since in the last Case b must of necessity be equal to c, therefore $x = \sqrt{\frac{8a^2 + d^2}{16}}$ a Theorem for the last Case.

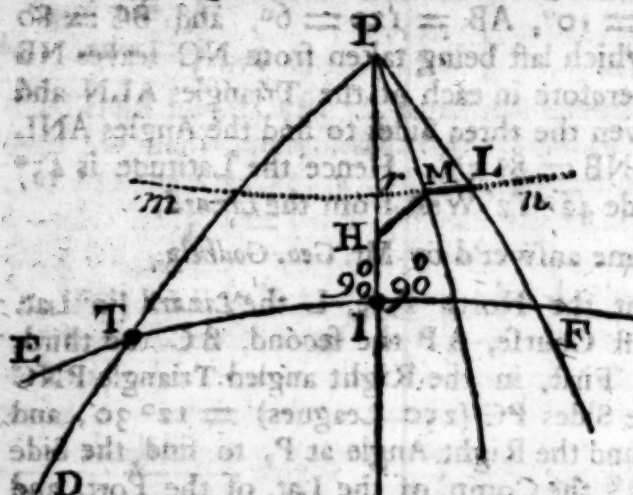
The same answer'd by Mr. Will. Spencer.

Given OE=a, AC=b, AO=c, then is OC=b-c, which put equal d. Let x=CG, the Breadth of the Parallelogram, then is x+d=OG, and (per 47 E. 1.) $\sqrt{a^2 - x^2 - 2dx - d^2} = EG = GF$: hence the Area of the Parallelogram is $2x\sqrt{a^2 - x^2 - 2dx - d^2}$ a Max. in Fluxions $2a^2xx - 4x^3x - 6dx^2x - 2d^2xx = 0$. $a^2 - 2x^2 - 3dx - d^2 = 0$, or $x^2 - \frac{3}{2}dx = \frac{a^2 - d^2}{2}$, whence $x = \sqrt{\frac{8a^2 + d^2}{16}} - \frac{3}{4}d$, which is a general Theorem for a Parallelogram.

Curious Answers to this Question were received also from Harland Widd, Mr. J. Holden, Mr. Charles Smith, Mr. Geo. Godhelp, Rimfide, Mr. Rob. Butler, Mr. Stephen Hartley, Mr. John Watchorne, Mr. Philip George, Mr. Tho. Garrard, Mr. Wm. Kingstone, Mr. Richard Gibbons, Mr. John Wiggleworth, Mr. John Williams, Mr. Paul Sharp, and Mr. Abr. Lord, the Proposer.

(4) Quest.

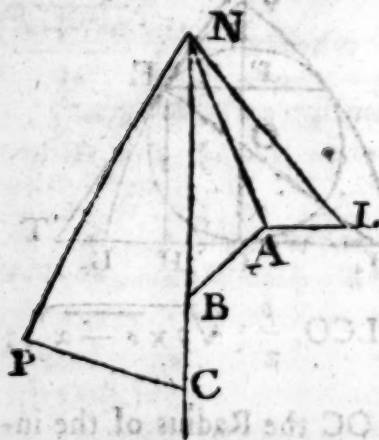
(4) Question 114. answer'd by Mr. Tho. Mofs.



Let P represent the North Pole, *mL* the Parallel of Latitude passing thro' L the *Lizard*. Moreover let LM, MH and HI represent the three given Distances sail'd by the Ship before she made her Observation at I.

Now as the Port is, by the Question, 250 Leagues due West off I, it is therefore manifest that it must lie in the great Circle *EIF* passing thro' I at Right Angles to the Meridian *PHI*; therefore let *IT* be the given Distance, draw the Meridian *PTD*: Then in the Right angled Spherical Triangle *PIT* are given *PI* (the Comp. of Lat. of the Place of Observation) and *TI*, whence *PT* (the requir'd Comp. of Latitude) and also the Angle *IPT* (the Port's Difference of Longitude from the Meridian *PHI*) is easily obtained: Moreover here is given *HI* the Difference of Latitude, and *HM* the Distance sail'd; whence by *Mercator's Sailing* the Diff. of Longitude (or the Angle *HPM*) may be found, and consequently the requir'd Longitude of the Port *T* (or the Angle *TPL*) for the Angle *MPL* is given by the Question. Q. E. D.

The same answer'd by Mr. Wm. Wigglesworth.



Let N represent the North Pole, L the *Lizard* Point in Lat. 50° North, and P the intended Port, *NC* is the Comp. of Lat. of the Place of Observation when due East from P = $45^{\circ} 25'$, and *CP* = 250 Leagues = $12^{\circ} 30'$ (by accounting 20 Leagues to a Degree) making Right Angles with the Meridian of P, from whence the Angle *CNP* is found = $17^{\circ} 41'$, and the Side *NP* = $44^{\circ} 02'$, the Comp't

Compl^t Lat. of the intended Port. Also there is given LA = 200 Leagues = 10° , AB = 120 = 6° , and BC = 80 Leagues = 4° , which last being taken from NC leaves NB = $41^{\circ} 25'$. Therefore in each of the Triangles ALN and ABN, there is given the three Sides to find the Angles ANL = $15^{\circ} 34'$ and ANB = $8^{\circ} 57'$. Hence the Latitude is $45^{\circ} 58'$, and Longitude $42^{\circ} 12'$ West from the Lizard.

The same answer'd by Mr. Geo. Godbelp.

Let N represent the North Pole, L the *Lizard* (in Lat. 50°) LA the first Course, AP the second, BC the third, and P the Port. First, in the Right angled Triangle PNC there is given the Sides PC (250 Leagues) $= 12^{\circ} 30'$, and NC $= 45^{\circ} 25'$, and the Right Angle at P, to find the Side PN $= 44^{\circ} 01' 43''$ the Comp. of the Lat. of the Port, and the Angle PNC the Port's Diff. of Long. from C $= 17^{\circ} 41' 29''$, and CN—CB $=$ NB $= 41^{\circ} 25'$. Now in the Oblique angled Spheric Triangle BNA there are given all the Sides to find the Angle at N $= 8^{\circ} 57'$. And the Diff. of Long. made by Sailing on the Parallel LA will be found $15^{\circ} 33' 26''$. Hence the Port's Diff. of Long. from the *Lizard* is found $42^{\circ} 11' 55''$ W. and Lat. $45^{\circ} 58' 57''$ North.

*Solutions to this Question were also received from Mr. Harland Widd, Mr. Wm Pirson, Mr. J. Holden, Mr. Abr. Lord, Mr. John Nichols, Mr. Stephen Hartley, Mr. Tho. Garrard, Mr. James Hogard, Mr. Alexander Rowe, Mr. Wm Kingstone, Mr. John Williams, and San-
ctus Harmon.*

(5) Question 115. answered by Mr. Jos. Orchard.

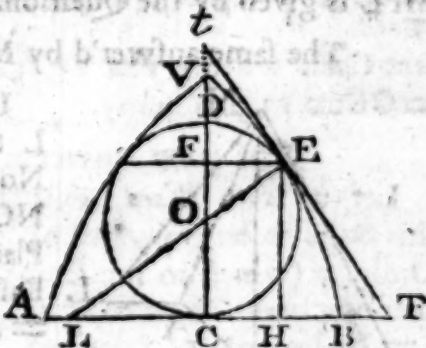
Let $VC = 31.3 = b$; $CB = 20 = c$, $p = \text{Parameter} =$

$$\frac{bb}{c} = 48,9845 \text{ CH} = x = \text{EF};$$

Then will $HB = c - x$, and
per Property of the Curve

$$p \times \overline{c-x} = \overline{HE}^2; \text{ the Sub-}$$

normal LH = $\frac{P}{2}$ and LC =



$$\frac{p-2x}{2} \text{ per firm. Triangles LHE and LCO, } \frac{p}{2} : \sqrt{p \times c - x} :$$

$$\frac{p-2x}{2} : p-2x \times \sqrt{p \times (p-x)} = OC \text{ the Radius of the in-}$$

scribed

32 Questions in last Year's Diary answered.

scribed Sphere. Again, (per 47 E. 1.) $\sqrt{LH^2 + HD^2} =$
 $LE = \sqrt{P^2 + APC - 4Px^1}$; and per sim. Triangles LHE and

$$LOF; \frac{P}{2} : \frac{\sqrt{P^2 + APC - 4Px^1}}{2} :: x : x \frac{\sqrt{P^2 + APC - 4Px^1}}{P} =$$

OE = OC the Radius as above; These Values made equal
 by Reduction we have $xx - \frac{4c+p}{3}x = -\frac{Pc}{3}$; whence x

$$= \frac{4c+p \pm \sqrt{16cc - 4cp + P^2}}{6} = 9.8536, \text{ and the requir'd}$$

Radius is 13.3243. Q. E. F.

The same answer'd by *Tabularius*, the Proposer.

Let $VC = 31.3 = b$, $BC = 20 = c$, $\frac{b^2}{c} = 49 = a$, HB
 $= BT = x$, $HE = y$, $CH = FE = c - x$, $CT = TE = c + x$
 by sim. Triangles $HE : TE :: FE : Et :: FE : OE$; viz. $y :$
 $c + x :: c - x : \frac{c^2 - x^2}{y} = OE$, and $y : 2x :: c - x : \frac{2cx - 2x^2}{y}$
 $= OF \therefore CO = y - \frac{2cx - 2x^2}{y} = \frac{c^2 - x^2}{y}$; and by the E-

quation of the Curve $ax = y^2 \therefore ax - 2cx + 2x^2 = c^2 - x^2$,

or $3x^2 - 2cx + ax = c^2$. Now putting $\frac{a-2c}{3} = \pm m$ ac-
 cording as a may be greater or less than $2c$, we get $x =$
 $\frac{c^2}{3} + m^2 \Bigg|^{\frac{1}{2}} \mp m = 11.644 - 1.5 = 10.144$ in the pre-

sent Case, whence $y = 22.2947$, and thence the Radius CO
 $= OE = 13.326$ nearly.

The same answer'd by Mr. Rich. Gibbons.

Let us with *Ward*, *Shircliffe*, and other Gaugers, make
 this Solid to be generated by the Parabola round its whole
 Ordinate (which to me seems to be the Proposer's Meaning)
 then we have $CB = 20 = c$, and $CV = 31.3 = b$, to find
 $r =$ Radius of its inscribed Semicircle $= CO = OE$; Put
 $2x =$ Subtangent HB , then by common Properties, As $c : b^2$
 $:: x : \frac{x b^2}{c} =$ the Square of HE , hence the Squ. of TE is $= \frac{x b^2}{c}$
 $+ 4x^2 =$ Square of CT by common Properties of the Cir-
 cle;

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ele; and therefore $= c^2 + 2cx + x^2$; hence $x = 10.1464$,
and $c - x = 9.8536$, and $\frac{x^2}{c} = 497.0163$ its Square Root
is $= 22.2939 = HE = x$. Hence by 47 E. 1. $\frac{x^2 + c^2 - 2cx + x^2}{2x}$
 $= r = 13.3245$, the Semi Axis of the requir'd Sphere.

The same answered by Mr. Holden.

Let BEV represent a Semi-Parabola, which by revolving
about its Semi-Ordinate $CV = 31.13 = b$, will generate a
Semi-Parabolic Spindle (the Radius of whose Base will be
 $CB = 20 = c$) at the same Time that the Semicircle CE will
generate an inscribed Sphere. Let ET be the Tangent to
the Circle and Parabola at the Point of Contact; then, by
the Property of a Circle $ET = TC$ and $ET^2 = TC^2$, and
by the Property of a Parabola $BH = BT$ $\therefore$ calling BH (x)
and HE (y), $y^2 + 4x^2 = EH^2 + HT^2 = c^2 + x^2 = ET^2$;
but $c : b^2 :: x : y^2 = \frac{b^2 x}{c}$ which substituted for y^2 gives $4x^2$
 $+ \frac{b^2 x}{c} = c^2 + x^2$, and consequently $3x^2 + \frac{b^2 - 2c^2}{c} x = c^2$
and $x^2 + \frac{b^2 - 2c^2}{3c} x = \frac{c^2}{3} \therefore x = \frac{2c^2 - b^2 \pm \sqrt{b^2 - 4b^2 c^2 + 16c^4}}{6c}$
 $= 10.146276$, whence $y = \sqrt{\frac{b^2 x}{c}} = 22.293727$, and $CD = HE$
 $+ \frac{HC^2}{HE} = y \frac{-c - x}{y} = 26.649027$, Half of which, viz.
13.3245135 is the Radius required.

This Question was truly sol'd by Harland Widd, Mr. Cha. Smith,
Mr. Geo. Godhelp, Mr. Abr. Lord, Rimfide, Mr. Steph. Hattley, Mr.
Wm Spencer, Mr. John Watchorne, Mr. Tho. Garrard, Mr. Wm E.
neser, and many others, as may be seen in the Catalogue.

(6) Question 116 sol'd by Mr. Wm Kingston.

Construction. Draw the indefinite right Line AP (see Fig. fol-
lowing) take two Radius's in the Ratio of the Line bisecting
the Base, and That bisecting the Vertical Angle, and draw the
two Arches op and mn . Draw RT at Right Angles to AP, and
Af and Ag thro' the two Points of Intersection. In RT take
 $Lb =$ the given Diff. of the Segments of the Base, and thro'
L draw DE parallel to AP till it meet AG produced in E;
draw AD at Right Angles to AE; bisect DE in S, and de-
scribe the Circle ADE; continue Af till it meet DE in E;
draw

$AC=BD$, and the Expression for the Perimeter will become

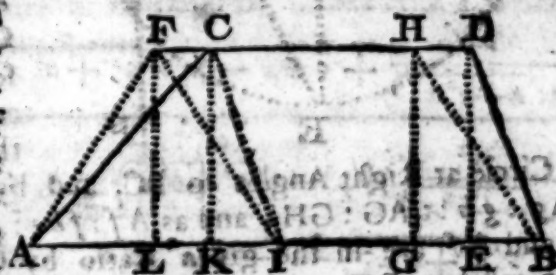
$\frac{2a}{y} + 2\sqrt{y^2 + d^2} \therefore \frac{a}{y} + \sqrt{y^2 + d^2}$ is a Minimum. In

Fluxions $\frac{ay}{y^2} = \frac{y}{\sqrt{y^2 + d^2}} \therefore \frac{a}{y} = \frac{y}{\sqrt{y^2 + d^2}}$ and squar-

ing both Sides the Equation $a^2 - ayy = a^2 d^2$, Solv'd
 $y = 12.8$ very nearly. Hence $AC=BD=13.1072$, $AB=$
 9.678888 , and $CD=15.32112$.

The same answer'd by Mr. Tho. Mofs.

Let $ABCD$ be a Trapezoid with unequal Sides, whose Area and Difference of the parallel Sides are given; which in order to demonstrate Geometrically, that



the Perimeter thereof ($AB + BD + DC + CA$) may become less, and yet the given Difference AI of the parallel Sides, and likewise the given Area ($ABCD$) remain the same. Let fall the Perpend. CK , draw CI parallel to DB , bisect AI in L , moreover draw LF parallel to CK meeting DC produced in F ; join FI and draw BH parallel thereto. Now 'tis plain that $LB = \frac{AB+CD}{2}$; and because of the parallel Lines IF and BH ,

IC and BD , AB and FD ; the Triangles FCI and HBD are similar and equal in all Respects; and therefore $FC=HD$, and consequently $FH=CD$; whence it appears that the two parallel Sides (and consequently their Difference) their nearest Distance to each other, and the Area may remain the same, and yet the two unequal Sides may vary: Therefore 'tis plain that CI (DB) $+ AC$, the Sum of the two Sides joining the Extremities of the parallel Sides of the Trapezoid; or which is the same, the Sum of the Sides AC , CI , of the Triangle ACI will be the least possible (and consequently the whole Perimeter of the Trapezoid) when they are equal to each other. Moreover it is further manifest that the required Trapezoid, whose Area and the Difference of the parallel Sides are here given, can be no otherwise varied than either to have four unequal Sides; or else those two Sides joining the two parallel Sides to be equal to each other; but, in the first Case it is proved above

34 Questions in last Year's Diary answer'd.

that the required Perimeter may be diminished, and the said Area and Diff. of Sides may remain the same; which therefore cannot obtain; whence the Perimeter of any Trapezoid is the least possible when the two Sides that join the Extremities of the parallel Sides are equal to each other. *Q. E. D.*

Now put the given Area = a , $AL (\frac{1}{2} AL) = b$, and $LB (\frac{AB+FH}{2}) = x$; then $LF = \frac{a}{x}$; and (per 47 E. 1.) $\sqrt{\frac{a^2}{x^2} + b^2} = AF = HB$; $\therefore \sqrt{\frac{a^2}{x^2} + b^2} + x =$ Half the requir'd Perimeter a *Minimum* $\therefore$ in Fluxions

$$\frac{b^2 x \dot{x}}{\sqrt{a^2 + b^2 x^2}} + 2x^2 \dot{x} - \dot{x} \sqrt{a^2 + b^2 x^2} - x^2 \dot{x} = 0, \text{ or}$$

$$\frac{b^2 x^2}{\sqrt{a^2 + b^2 x^2}} + x^2 - \sqrt{a^2 + b^2 x^2} = 0, \text{ Consequently } b^2 x^2 +$$

$x^2 \sqrt{a^2 + b^2 x^2} - a^2 - b^2 x^2 = 0$, $\therefore x^2 \sqrt{a^2 + b^2 x^2} = a^2$ and $b^2 x^6 + a^2 x^4 = a^4$, from whence the Value of x may be found.

The same answer'd by Mr. William Bevil.

Let ABHF represent a Trapezoid (see the last Fig.) Put $2x = AB + HF$, $2a = AB - HF$, $b =$ the square Poles in one Acre, then $x + a = AB$ and $x - a = HF$, and

$\frac{b^2}{2x} = \frac{1}{2} DE = \frac{1}{2} FL$; and (per 47 E. 1.) $\frac{b^2}{x^2} + a^2 = HB^2 = FA^2$: Therefore $2 \times \frac{b^2}{x^2} + a^2 + 2x$ is a *Min.* and in

$$\text{Fluxions } \frac{-4b^2 x \dot{x}}{x^4} \times \frac{4b^2}{x^3} + 4a^2 \dot{x} - \dot{x} + 2\dot{x} = 0, \text{ or } 2x^3$$

$$\sqrt{\frac{4b^2}{x^2} + 4a^2} = 4b^2, \text{ and } bx^2 x^4 + a^2 x^2 = b^4; \text{ Hence } x = 12.5$$

nearly $\therefore AB = 15.3211$, $DC = 9.6786$, and $AF = BH = 13.107191$.

The same answered by Mr Joseph Orchard.

Let ABHF represent the Trapezoid (see the last Fig.) Now the Perimeter of a Circle being less than that of any other Figure having the same Area, it is plain the required Trapezoid must be inscribed in a Circle, and that $AL = GB$

36 Questions in last Year's Diary answer'd.

Object when the Angle included between the Meridian and Shadow of the Object is a *Minimum*.

For if we conceive the Triangle ABC to stand upon the Base BC, perpendicular to the Plane of this Paper (which here represents the Plane of the Horizon) then will the Shadow of the Top of the Object A fall upon the Point D, and DC will be the Length of the Shadow when the Object is directed towards the Sun: Now if we imagine the Plane of the Triangle ABC to revolve round the Centre C upon the Base BC, always keeping perpendicular to the Plane of this Paper, then will A, the Top of the Object always be perpendicular to some Point in the Periphery of the Circle SBRNES, and the Length of the Shadow (reckoned from that Point) will always be equal and parallel to BD; consequently the Shadow of A, the Top of the Object, will always fall in the Periphery of the Circle DEO. Thus when the Top of the Object A, becomes perpend. to the Point R, then will the Shadow of the Object CA fall upon CE, making RE equal and parallel to BD = CP, and since (by Construction) PE is equal, and consequently parallel to CR, we have a very easy Method of

Calculation. Put p and q for the Sine and Cosine of the Angle of Elevation of the Object, n and m for those of the Sun's Altitude, and call the Length of the Object Radius or Unity; then by plain Trigonom. $n : p :: m : \frac{pm}{n} = BD = PC$.

Again, $\frac{pm}{n} : 1 :: q : \frac{qn}{pm} = \text{Sine of the Angle } PCE = BCR = 44^\circ 52' 47''$. Hence the Angle RCN = $69^\circ 07' 20''$, and NCE = $21^\circ 07' 06''$, whence we have this

Theorem. Multiply the Tangent of the Sun's Altitude by the Cotangent of the Elevation of the Object, the Product is the Sine of the Angle included by the Line of the Sun's Azimuth and the Direction of the Object when the Shadow of the Object and the Meridian Line make the least Angle possible.

N. B. When the Altitude of the Sun is equal to, or greater than, the Elevation of the Object, then this admits of no *Minimum*.

The same answer'd by Mr. Wm. Kingstone.

Let AC = 1 = the Length of the Staff, then will BC = ,809017, AB = ,587753 = b , and BD = ,821642 = a .

Put $x = \text{Sine} \angle ABD$, then will

$$\frac{bx}{a - \sqrt{1-x^2}} = \text{Tang. of the } \angle$$

ADB a *Maximum*, and in Fluxions

$$\text{is } b\dot{x} - b\dot{x}\sqrt{1-x^2} - \frac{b^2 x^2 \dot{x}}{\sqrt{1-x^2}}$$

$$= 0, \therefore ab\dot{x}\sqrt{1-x^2} - b^2\dot{x} +$$

$$b^2 x^2 \dot{x} - b^2 x^2 \dot{x} = 0 \therefore ab\sqrt{1-x^2}$$

$$- b^2 + b^2 x^2 - b^2 x^2 = 0 =$$

$$ab\sqrt{1-x^2} - b^2 \therefore \sqrt{1-x^2} =$$

$$\frac{b}{a} = .715379 = 44^\circ 19' 52'', \text{ and}$$

the Angle $D = 45^\circ 40' 27''$;

whence the required Angle DAE

$= 21^\circ 13' 04''$, and the Angle

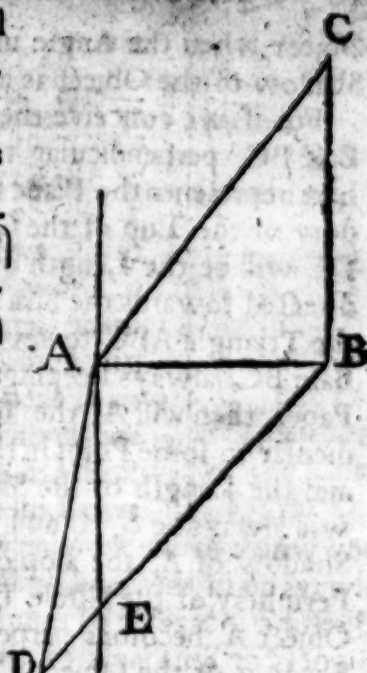
$BAE 68^\circ 46' 56''$

More curious Answers might have been

exhibited to this Question from Harland Widd, Mr. J. Holden, Mr. Abr.

Lord, Mr. Wm Spencer, Tabularius, Mr. Tho. Moss, and others, but

we have purposely omitted them, to make Room for what follows.



(9) Question 119 answer'd by Mr. *Abr. Lord*.

For the Distance of the Candle at the 2d Observation put x , for 60 put a , then the Distance at the 1st Observation will be $a+x$; but it is proved by the Writers on Optics, that Light decreases in the reciprocal duplicate Ratio of the Squares of the Distances. Therefore $x^2 : 2 :: x^2 + 2ax + a^2 : 3$, then multiplying Extreams and Means, and reducing, we have $x = 2a + \sqrt{6a^2} = 266,9693845$ Yards. Therefore the 1st Distance is had $= 326,9693845$ Yards, the Answer required.

The same answer'd by Mr *William Enefer*.

Whether the ingenious Proposer meant that the apparent Diam. or the Effects of the Light of the Candle should be in the given Proportion, does not from the Data of the Question to me seem determined, and therefore shall give a Solution upon both Suppositions.

1st Supposing the apparent Diam. of the Candle's Blaze be meant.

Put DC the given Distance $= 60 = a$, AB the Semi-Diam. of the Candle's Blaze $= v$, $\text{Sine } \angle DCB = 2x$, then (by Qu.) $\text{Sine } \angle ADB = 3x$, and $\text{Rad.} = 1$. By plain Trigonom.

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$2x : v :: 1 : \frac{v}{2x} = BC$, and $3x : v :: 1 : \frac{v}{3x} = BD$, whence it is evident that BD will always be to BC, in the Ratio of the $\angle DCB$ to $\angle ABD$, viz. (in this particular Case) of 2 to 3. Hence (see Mr. *Simpson's Algebra*, p. 310.) this *Geometrical Construction*.

Draw the Right Line CH of any convenient Length, in which make $CD =$ the given Distance; and make CE to DE as 3 to 2, then take EO to EC as DE to $CE - DE$, and upon O as a Centre describe (with the Rad. OE) the Semi-circle EBF; then if the two Lines CB and DB be drawn to meet any where in the Periphery thereof, the Angles C and D will always be in the constant Ratio of 2 to 3. Consequently the Question is capable of innumerable Answers, according to the Bigness or Smallness of the Blaze; for it might be at any Distance not less than CD, nor greater than FC.

2^{dly}, by supposing the Effects of the Light to be meant.

Put $60 = d$, and $x =$ the Dist. of the Observer from the Candle at the 1st Observation; then $x - d$ will express his Dist. therefrom at his 2^d; and since the Effects are reciprocally as the Squares of the Distances $x^2 : 3 :: x^2 - 2dx + d^2 : 2 :: 2x^2 = 3 \times x^2 - 2dx + d^2$, whence by proper Reduction, completing the Square, &c. $x = \sqrt{6dd} + 3d = 326,964$ Yards.

The same answer'd by Mr. *Tho. Garrard*.

From the Data of this Quest. it don't clearly appear (to me) whether the ingenious Proposer's Meaning was, That the Degrees or Quantity of Light which he received from the Candle at the 1st Observation, was to that which he received at the 2^d as 2 to 3; or whether he means, That the apparent Diam. of the Candle (or Angle under which the same was seen) at the first Observation, was to that at the second in the same Ratio; I shall therefore consider it under both Cases.

Put $x =$ the requir'd Distance at the first Observation, and $d = 60$ Yards, then will $x - d =$ the Distance at the 2^d Observation. Now if we consider it under Case the first (because the Degrees of Light, Heat, and Attraction are reciprocally proportional to the Squares of the Distances from the Centres of their primary Causes) we have $2xx = 3x^2 - 6dx +$

$3dd \therefore x^2 - 6dx = -3dd$, and by compleating the Square, we have $x = d\sqrt{6} + 3d = 326,969$. But if we take the Question in the latter Sense, seeing the Semidiameter of the Blaze of the Candle may be supposed very small, or nothing in Comparison to the Observer's Distance from it, the Distances at each Observation was in the given Ratio of 3 to 2, or $2x = 3x = 3d \therefore x = 3d = 180$.

(10) Question 120. answer'd by *Rimside*.

In this Question the greatest Cylinder that can be inscribed in the Cask is the same with the greatest that can be inscribed in the Spheroid, and therefore may be thus solved. Put (t) and (c) for the Semi-transverse and Semi-conjugate Diameters of the generating Ellipsis, (a) for the Content of the Cask, (b) for the Content of the greatest Cylinder, (d) for the Divisor $= 359,05$, and (x) for half Length of the Cask: Then

per Conics $t^2 : c^2 :: t^2 - x^2 : \sqrt{\frac{t^2 c^2 - c^2 x^2}{t^2}}$ = half the Head

Diam. and per *Ward's Young Mathematician's Guide*, the Content of the Cask will be $\frac{24t^2 c^2 x - 8c^2 x^3}{3t^2 d} = a$, in which Equation

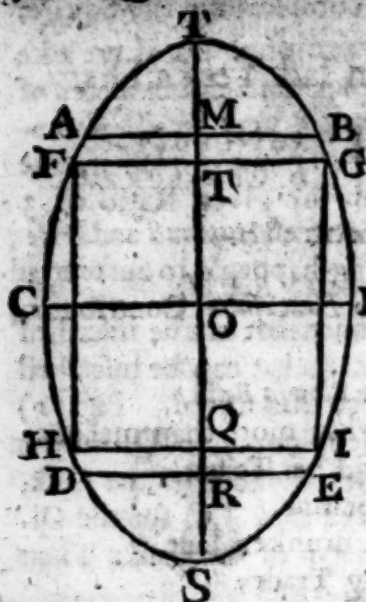
we have $c = \sqrt{\frac{3t^3 a d}{24t^2 x - 8x^3}}$. The Content of the greatest Cylinder in Ale Gallons is $\frac{16c^2 t^2}{5,196d} = b$, in which Equation

will be had $c = \sqrt{\frac{5,196bd}{16t}}$: then from these two Values of (c) this Equation will arise, $124,704t^2 bdx - 41,568bdx^3 = 48t^3 da$, which reduced will give $x = 30$ nearly, the Bung $= 50$, the Head $= 36$, and Length of the Cask $= 60$.

The same answer'd by Mr. *Joseph Orchard*.

Let $TS = 2t = 86,458$ (see the following Figure) $MR = 2x$; $CN = 2z$; $a = 350,703 \times 282$ the Content of the Cask; $c = 231,706 \times 282$ the Content of the Cylinder in Cubic Inches; and $m = 7854$. Then per Conics $t^2 : x^2 :: t^2 - y^2 : t^2 - y^2 \times x^2$
 $\frac{t^2 - y^2 \times x^2}{t^2} = \frac{FP}{FG} \therefore FG^2 = \frac{4x^2 \times t^2 - y^2}{t^2}$, and $\frac{8mx^2 \times t^2 - y^2}{t^2}$
 $= c$, the Content of the Cylinder, which suppose the greatest inscribed in the Spheroid; then will $t^2 - y^2$ be a Minimum;
 in Fluxions $t^2 - 2y^2 y = 0$, Reduc'd $y = \frac{t}{\sqrt{2}}$ which substituted

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tuted for y in the Content gives

$$\frac{16mzx^2}{3\sqrt{3}} = c \cdot x^2 = \frac{3c\sqrt{3}}{16m}$$

By proceeding as above, and by a known Theorem, the Content of the Cask is
$$\frac{8mx^2 \times 3x^2 - x^3}{3x^2} =$$

a , and if we take $x=y=\frac{2}{\sqrt{3}}$ in this Expression, the Content is
$$\frac{64mzx^2}{9\sqrt{3}} = a$$
, and comparing it with the above * find it cannot be so unless $c = \frac{3}{2}a$, but c is less than $\frac{3}{2}a \therefore y$ is less than x , and consequently the above Content

of the Cylinder is that of the greatest inscribed in the Cask also; likewise $z^2 = \frac{3c\sqrt{3}}{16m} = \frac{3x^2a}{8m \times 3x^2 - x^2}$ from the Content of the Cask) which reduced is $3x^2 - x^3 = \frac{2x^3a}{c\sqrt{3}}$ where $x=30$ nearly, $y=25$; hence the Cask's Length is 60 Inches, the Bung Diam. 50, and the Head 36. Q.E.F.

ERRATA and EMENDATIONS.

In Mr. *Sharp's* Solution to Quest. 10. (see last Year's *Diary*) put $t =$ Sine $\angle BSC$, then will 1,5708 $\cdot t \cdot p =$ the requir'd Area inscribed in a Rhomboides. Mr. *Smith's* Solution to the same Question is founded upon false Principles; The Transverse Diam. of the inscribed Ellipsis can only be parallel and in the Midway between the two longest Sides of the Rhomboides, when such Rhomboides becomes a Rectangled Parallelogram, as might be easily demonstrated, but Time will not permit me to do it now.

Tabularius.

In my Solution to Quest. 3. 1751, the Number will be
$$\frac{\sqrt{193}}{2} =$$

6,94622 Cubic Feet of Water in one Second of Time $= 3,876235$ Hundred Weight; Then, $3,876235 : 1'' :: 2,376235 : 0'',61303$, and $1'' : 13,89244$ (the uniform Velocity of the Water) $:: 0'',61303 : 8,51648$ the uniform Velocity of the Wheel in one Second; whence 4,696776 Seconds is the Time of one Revolution of the Wheel; and 766,049899 the Revolutions in an Hour; whence the Stone makes 4309,030682 Revolutions, and the Quantity of Meal ground is 538,628835 Pints $= 8,4167$ Bushels.

In Page 38, 1752, in my Solution to Quest. 9th, for Sun's Amplitude read Semi-diurnal Arch, *William King Sen.*

Answers to the Ænigma's in last Year's Diary.

- | | | |
|----------|-----------|---------------|
| 1. NOSE. | 3. HAT. | 5. NEEDLE. |
| 2. FEAR. | 4. HEART. | 6. CORKSCREW. |

Stitch and *Blowfa-bella*; or a Quarrel between *Husband* and *Wife*; who in the course of their Scolding happen'd to answer all the last Year's Ænigmas. By a *Lancashire* Contributor, who subscribes himself *Algebra*.

OLD *Stitch's* Spouse, kind *Blowfa Bella*,
One Day prov'd somewhat more than mellow:
Poor *Stitch* suppos'd she'd try'd her Talent,
As oft before with am'rous Gallant.

How now (quoth he) you drunken Jade,
What! never leave the wh—g Trade;
See! there the Fox has seiz'd your NOSE: 1
So thus from Words, they fell to Blows:
For without FEAR of Man, or Devil, 2
They could no longer now be civil:
Resolv'd t' avenge each other's Wrongs,
He takes the Yard, and she the Tongs.
You Rogue — You Whore, — there, take you that
Off goes her Pinners, then his HAT. 3
At length with Fighting both are tir'd,
A Respite therefore both requir'd:
Poor *Stitch* sat down, his NEEDLE took, 5
And sob'd, and sigh'd in sullen Look:
Then swore, You Vixen, sure we'll part; —
You scoundrel Dog, with all my HEART. 4

In angry Mood so *Blowfa* runs
To quench her Fury at the *Tuns*;
Comes bouncing in, then rings and bawls,
And for a Flask of *Florence* calls:
It comes — You Blockhead, where's the Fork,
Or BOTTLESCREW? to draw the Cork. 6

The PARADOX answer'd by the same Hand.

Alas! poor Gard'ner, why in so much Pain
To be turn'd off, or thus perplex the Brain;
Discharge thy Fears, a Method one may find
To make all plain, and so relieve the Mind;
Why! thus it is — A Circle you must have
To solve th' Ænigma, and your Place to save: Here

Here let the whole Circumference be grac'd
 With Trees, an Hundred equidistant plac'd;
 'Tis then, e'en to a Demonstration, clear,
 There will no Three in one Right Line appear:
 But fix one more i'th' Centre of the Ground,
 And then there'll Fifty equal Rows be found.

All the *Ænigmas* answer'd by Mr. *John Chester*.

Black Night now approach'd, and Bus'ness forsook,
 And wanting Amusement, your *Di'ry* I took;
 My Taper I lighted, to work went my Brain,
 Th' ingenious *Ænigmas* intent to explain.
Pickburn sings smoothly, and well, yet suppose
 That thro' his dark Lab'rincths we're led by the Nose; 1
 Can *Hammond* now FEAR *Peas*'s well-handled HAT, 2, 3
Phillea's HEART dances, and beats pit-a-par; 4
Woolley's smart NEEDLE pierces like *Hensford*'s bright } 5
 My Taper's expiring, so Gents all adieu. [SCREW. } 6
Woolwich, Seventeen hundred and Fifty two.

Mr. *William Ingram* answers the *Ænigmas* and Paradox thus:

One Ev'ning alone I sat myself down,
 In order each Riddle to answer;
 If right is my Letter, or wrong 'tis no matter,
 For hit or miss, all is by Chance, Sir.
 The First I suppose I may say is a Nose,
 And FEAR in the Second's reveal'd;
 If I'm right in that, the Third is a HAT,
 And the Fourth cannot long be conceal'd;
 I believe 'tis a HEART; but as for my Part,
 The Fifth, to me yet is a Riddle,
 I think I will leave it: but hold, now I have it,
 If I don't mistake, 'tis a NEEDLE.
 A BOTTLE-SCREW call the Sixth, which is all,
 I now to the Paradox shift ye,
 Place an Hundred Trees round, no Row there'll be found,
 Add one in the Middle, there's Fifty.

Paradox and *Ænigmas* answer'd by Mr. *Rob. Marsh*.

Gardener, in Circle plant your Hundred Trees, ne'er FEAR, 2
 Your HEART keep up, no reg'lar Row'll appear; 4
 Set one i'th' Centre, there's your Fifty Rows, [6, 5, 3, 1
 Or take my CORKSCREW, NEEDLE, HAT, and Nose.

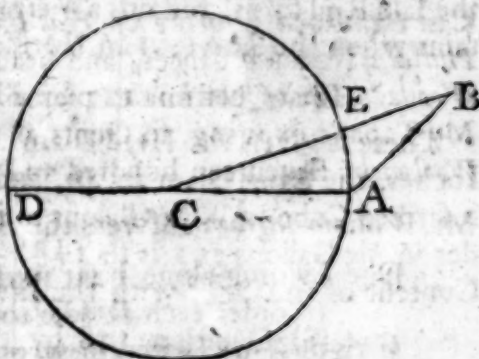
All the *Enigmas* answer'd by Mr. S. Hammond of Nottingham
 A CORKSCREW, NEEDLE, HEART, HAT, FEAR, and NOSE,
 Do Sixth, Fifth, Fourth, Third, Second, First disclose.

In the manner they were answered by Mr. J. Holden, St. Chad,
 Franky Pennell, Mr. W^m Swift, Mr. Jason Worrall, Mr. R. Collins,
 Mr. Geo. Godhelp, Mr. John Dike, Mr. Rob. Peckham, Mr. John Ni-
 chols, Mr. John Lewin, Mr. W^m Spence, Mr. John Watchorne, Mr. Fran.
 Joce, Mr. John Ramsay, Mr. W^m Heaford, Mr. John Palmer, Mr. John
 Williams, and many others, as may be seen in the Catalogue.

New MATHEMATICAL QUESTIONS, to be answer'd
 in the next Year's Diary.

(1) Question 121. by Harland Widd.

IT is required to deter-
 mine (by an Equation
 not exceeding a Quadratic)
 the Position of the Line
 AB of given Length, when
 the Mixtilineal Area AEB
 comprehended by the Arch
 of the given Circle AED,
 and the Lines AB and EB
 is the greatest possible?



(2) Question 122 by Mr. Abr. Lord.

It is required how many Times a conical Glass, whose Depth
 is 4 Inches, and its internal concave Surface is double the Area
 of its Base (or Brim) may be filled out of a Punch Bowl whose
 Form is a Parabolic Conoid, its Depth 12 Inches, and its in-
 ternal concave Surface double the Area of its Base (as in the
 Cone;) by a Quadratic Equation?

(3) Question 123 by Mr. Abr. Lord.

Standing at a Door I took an Angle of Altitude of a May-
 Pole, my Eye being then 5 Feet above the Level of the Bottom
 of the Object: then going into an upper Room at a Window
 perpend. over the said Door, and 30 Feet above my first Station,
 the Angle of Altitude was the Comp^t of the former to a Right
 one, and the Angle from the Vertex to the Level of the first
 Station was $56^{\circ} 19'$. *Quære* the Height of the May Pole?

(4) Question 124. by Mr. Rob. Busler.

Given the three Angles of a Triangular Prism = 50, 60,
 and 70 Degrees respectively, and the superficial Content of
 its

44 New Mathematical Questions, 1753.

its Outside $\equiv 100$. Required the Solidity when a *Maximum*, or the greatest possible?

(5) Question 125. by Mr. *John Watchorne*.

Given the Solidity of the Sector of a Sphere $\equiv 1413.72$, and the Radius $\equiv 15$, to determine the greatest inscribed Cylinder?

(6) Question 126 by Mr. *Thomas Moss*.

If the Middle of a perfect cylindrical inflexible Rod whose Length is 48 Inches be so fix'd as to turn freely upon a Pin, and at one End of the said Rod let a Cone be fix'd upon its Base whose Diam. is 10 Inches and Altitude 16; also let the said Cone be made to ascend by a Power acting at the other Extremity of the said Rod: to determine the Position thereof when the said Rod turns, sustains a Weight, which is to that it sustains when the Rod is in an Horizontal Position as 3 to 4?

(7) Question 127 by Mr. *William Bevil*.

There is given the Head Diam. of a spheroidal Cask $\equiv 32$ Inches, the Bung Diam. $\equiv 40$, and the Content of its greatest inscribed Cube in Wine Gallons to its greatest inscribed Cylinder in Ale Gallons as 1 is to $1\frac{3}{4}$. Required the Length and Content of the Cask, with the Investigation of the same?

(8) Question 128 by Mr. *Rich. Gibbons*.

Ramhead bears S.W. by W. from *Plymouth* Fort; and *Edystone* due S. from *Ramhead*, at 3 Leagues Distance; from which last Place we sail'd on a Parry of Pleasure, due East; until our Boat was in a right Line between *Edystone* and the Fort; from whence we saw the Flash of a Piece of Ordnance, Fifteen Seconds of a Minute before we heard the Report: Now suppose Sound to move 1142 Feet in 1 Second? Required the Bearing and Distance of *Edystone*; likewise the Distance of *Ramhead* from the Fort, with the Construction?

(9) Question 129 by Mr. *William Wigglesworth*.

Given the Line bisecting the Angle at the Base of a Right-angled Triangle $\equiv 48$ Chains, and the nearest Distance from the Right Angle to the Periphery of the inscribed Circle $\equiv 4$ Chains, to find the Sides?

(10) Question 130 by *Nummularius*.

What Annuity, to continue for 20 Years only, may be purchased for 1000 Pounds ready Money, allowing the Purchaser Five per Cent. per Ann. Compound Interest for his Money?

The GENT. Diary; or, Math. Repository. 45
New Ænigmas to be answer'd in next Year's Diary.

(1) Ænigma 83 by *Somebody*.

W HATEVER different Paths Mankind pursue
'Tis Me they principally keep in view,
'Tis Me, in ev'ry Action, they intend;
The noblest Motive and superior End!
'Tis I the scarcely-finish'd Soul incline,
It's first Desire and conscious Thought is mine;
The Infant Breast is sway'd by me alone,
When *Pride* and *Jealousy* are yet unknown.
Thro' Life's obscure and wild Variety,
Man's steadfast Wishes never start from me;
I am of all his waking Thoughts the Theme,
He courts me too in ev'ry nightly Dream:
Th' immortal Flame with equal Ardor glows,
Nor one short Moment's Intermission knows,
Whether to *Courts* or *Temples* Men repair,
With restless Zeal they search me ev'ry where;
Whether the Roads that to Perdition lead,
Or those which guide them to the Stars they tread,
I am the fair, inestimable Prize,
The glorious Mark on which they fix their Eyes!

(2) Ænigma 84. by an ancient *Poet*, and a modern *Sap Scull*.

My Empire meaner is, than is my Birth,
I'm made of Mold-refin'd, not common Earth;
Have *Flesh*, and *Bones*, and *Blood*, endu'd with *Life*,
And peaceful live, a Stranger to all Strife:
Yet the bold *Hero* whom *Ambition* arms,
Faces grim *Death*, but starts at my Alarms:
The *Gold-lac'd* General does dread my Sight,
More than the daring *Foes* he stands to fight;
And tho' his happy *Standards* do prevail,
E'er Night to me, he surely turns his Tail.

I the *Grand Signior* do surpass in Pride,
For I on *Christians* Backs in State do ride!

Nature refines what is by Nature crude,
For me she cooks and dresses Human Blood,
To make it to my Palate pleasing Food.

I many *Heroes* too do force to yield,
Who strip to own me Master of the Field:
Yet 'twould be great Injustice to pass o'er
How kind I am, and mindful of the *Poor*;

Whate'er befalls them of *Calamity*,
 They're sure to find a *Bosom Friend* in me!
 Which make poor Cripples, begging in the Street;
 To beg for me of ev'ry one they meet:
 Who can my Pow'r describe, my Glories scan?
 I'm Lord of *Nature*, since I'm Lord of *Man*;
 In these you may my wondrous Value see
 The *World* was made for Man, and Man for me!

(3) *Enigma 85* by *Tom Faggot*.

ON me the Graces and Delights attend,
 On my propitious Influence
 Your gayest Hours depend;
 Whatever charms the Soul or Sense,
 Beauty and Sacred Harmony
 Does properly belong to me.
 To me, his shining Genius *Strepson* owes
 His just *Ideas* and *Expressions* fit
 To me *Cleora* owes that sprightly Wit
 Which from her Lips in easy Language flows.
 The *mute* Creation owns my Sway,
 And Things inanimate my Laws obey;
 At my Command the first *Confusion* ceas'd,
Chaos and wild Disorder were appeas'd,
Discord and fierce *Antipathy* grew mild,
 The Gleams of *Light*, thro' yielding *Darkness* smil'd,
 And warring *Elements* were reconcil'd. }
 No fabled *Venus* gave me Birth
 At *Cyprus*; yet the Goddess was not nam'd,
 Nor at *Idalia*, nor at *Paphos* fam'd:
 Nor yet was fam'd from foaming *Seas* to rise;
 For yet no *Seas* appear'd, or *Fountains* flow'd,
 Nor yet, distinguish'd in the Skies,
 Her radiant *Planet* glow'd.
 But I was long e'er *Motion* sprung its Race,
 E'er *Chaos* and immeasurable Space }
 Resign'd their uselefs Rights to elemental Place.
 Before the sparkling Lamps on high
 Were kindled up, and hung around the Sky;
 Before the first *Intelligences* strung }
 Their golden Harps and soft *Preludiums* sung
 To me, the mighty *Cause* whence their *Existence* sprung. }
 By this my glorious *Linage*, you may see
 My high *Descent*; for God himself is *Me*.

(4) Ænigma 86 by Mr. Sam. Hammond, of Nottingham.

Upon a level, barren Ground, In open Light, I'm often found;
 But as the Darkness, where I'm seen, is spread, I disappear.
 And tho' this is contrary quite, Unto the Nature of a *Spright*,
 Yet I do very often *ape*, Fam'd *Proteus* in changing *Shape*.
 I'm oft transformed to a *Woman*, A *Man*, or *Child*: 'Tis also common
 For me to represent a Day O'th' Month, the present Year, or play
 A *Metamorphosis* into A Sum of *Money*, or a new
 Reg'ment of *Foot*, or Troop of *Horse*, Or any other *Warlike Force*.
 There's scarce a *City*, *Corporation*, Or *County* in the *British Nation*,
 But I've been known to represent In the high Court of *Parliament*,
 Where I am oftner mention'd than The *King*, or any other *Man*:
 And at both *Houses* have a Share In many Things transacted there.
 But tho' I am convenient In ev'ry well-fram'd Government,
 I'm only us'd (so hard's my *Hap*) To serve a *Turn*, or stop a *Gap*:
 Contin'd only during Will, And, am discarded, when to fill
 My *Place* a fitter *Person's* chose, Till when I'm kept a *Pris'ner* close,
 And cruelly in *Bonds* confin'd A *Pledge* for whom my *Post's* design'd.
 For this ill Usage the *Pretext* Is that I ha'n't a *Grain* of *Sense*,
 Which my *Successor's* valu'd for; Who takes Occasion on that *Score*
 To *fully* my poor *Innocence*, For Service past, sad *Recompense*! [feel
 But, notwithstanding, when the *Wheel* Of *Chance* turns round some People
 My *Influence* so strong that you My *Name* may in their *Visage* view.

(5) Ænigma 87 by Mr. John Noorthouck.

In bar'rous Nations first I took my Rise,
 Tho' now politer People do me prize;
 And, they thro' *Love* to me, and to *Vain-Glory*,
 Exclude more *useful* Things, known long before me:
 Nay, now the *meaner* Sort, thro' *Emulation*
 Will me possess, how poor soe'er their Station,
 And spend that *Time* in trifling about me
 Much *worse* than those who chuse to live without me:
 Tho' my *Admirers* in me take great Pleasure,
 And in my *Company* employ their Leisure;
 I make them *weak*, with *Fancies* fill the *Head*,
 And even *Sticks* or *Straws*, or *Shadows* dread.
 Am much admir'd and lov'd by *Woman-kind*,
 Who (spite of *Reason*) to my Faults are blind
 (Whose *Husbands* finding Things do not go right,
 On my *Attendants* often wreak their Spite)
 Attending *Congregations* of my pitching,
 More constant than to any *Parson's* Preaching,
 And with more *Zeal* — But hold, no more I'll say
 My true *Admirers*, tell my Name I pray.

(6) Ænigma 88 by Mr. R. M. of Nottingham.

FROM Earth I sprung well known in ancient Fame,
 And sacred held in great *Saturnus* Reign;
 One gentle Draught from my surprizing *Stream*,
 Will Wonders do, and ease the *Mind* of Pain:
 To *Love-sick Maids* it quickly brings a Cure,
 And *perjur'd Swains* does with Oblivion lure,
 A grander Opiate than *Æsculapian* Lore,

And gentle Ease, it gives to Womankind,
 For *Visits* miss'd, or Torments of the *Mind*,
 For Loss at *Whist*, ill Luck at dear *Quadrille*,
 Or *Parrot* dead, or pretty *Lap-Dog* ill :
 It cures the *Gout*, the *Phthisic*, and the *Spleen*,
 By gentle *Ways*, scarce either felt or seen ;
 Nay, *Amputations*, or a broken *Bone*,
 The *Vapours* frightful, or a Fit o'th' *Stomach*,
 A *Lawyer's Conscience*, or a *Courtier's Fears*,
 And ev'ry other *Ill* that *Mankind* bears.

An Alphabetical Catalogue of Contributors to this Diary.

The Letters i, ii, &c. shew the Quest. the Figures the *Ænig.* each answer.

M R. W^m Abbot ii, ix. all *Æ.* in Ver. Algebra all *Æ.* and Par. in V.
 Mr. Wm Bevil i, ii, vii, ix, x. prep. 1 Q. Mr. Fra. Booth 2 and
 Par. Mr Rob. Butler i, ii, iii, vii, ix. pr. 1 Q. St. Chad all *Æ.* in Ver.
 Jack Careless i, ii, ix, x. 1, 2, 3, 5, 6. and Par. in V. Mr John Chester 1, 3,
 5, 6. in V. pr. 1 *Æ.* Mr Jonathan Coley all *Æ.* but iv. Mr R. Collins all but
 4 V. Par. and pr. Par. Mr John Dyke all *Æ.* and Par. in V. Mr Wm
 Earle i, ii, vii. Ecl. Mr Wm Enefer i, ii, v, vii, ix, x. 1, 2, 3, 5, 6. Mr.
 Ja. Gane all *Æ.* and par. in V. pr. Par. Mr Tho. Garrard all Q. Mr. Edw.
 Greensted Ecls. Mr Ph. George i, ii, iii, v, vii, x. pr. 1 Q. Mr Ri. Gibbons
 all but viii. 1, 2, 3, 5, 6, and Par. in V. Mr Geo. Godhelp all but vi and viii.
 all *Æ.* and Par. in V. Ecl. Harland Widd all but vi. Par. Ecl. and Tran.
 pr. 1 Q. Mr S. Hammond all *Æ.* and Par. in V. pr. 1 *Æ.* 1 Par. and 1 An.
 Mr St. Hartley i, ii, iii, iv, v, vii, ix. all *Æ.* but 4 Ver. pr. 1 Q. and 1 *Æ.*
 Sanctus Harmon. iv. x. Mr Wm Heaford all *Æ.* and Par. V. pr. 1 *Æ.* Mr J.
 Holden all Q. and all *Æ.* and Par. in V. pr. 1 *Æ.* Mr J. Hollingworth all
Æ. but in V. and Par. Ecl. and Transit 8. Mr Ja. Hogard iv, all but 4 *Æ.*
 Ecl. Mr Cha. Jacka all *Æ.* but 2 in V. Mr John James Ecl. Mr Wm In-
 gram all *Æ.* and Par. in V. pr. 1 Reb. Mr Fra. Joce all *Æ.* in V. pr. 2 *Æ.*
 Mr Tho. Killingley all *Æ.* in V. Mr Wm Kingstone all Q. and all *Æ.* but 4.
 pro. 1 Q. Mr John Lewin all *Æ.* but 4 in V. Par. pr. 1 Reb. Mr Abr. Lord
 all Q. and all *Æ.* but 2. Par. Ecl. and Tran. 8 a Tab. of Ecl. for 20 Years.
 M. W. of W. ii, ix. Mr Rob. Marsh all *Æ.* and Par. in V. Mr Cha. Mason
 Jun. Ecl. Mrs Maywood 1, 3, 5, 6. Mr Th. Moss all but iii. Mr John Ni-
 chols i, iv, vii, ix, x. all but 4 and Par. Mr John Noorthouk ix. all *Æ.* in
 V. and Par. pr. 2 *Æ.* and 2 Reb. Mr Jos. Orchard i, ii, v, vii, x. all *Æ.* pr.
 1 An. Mr John Palmer all *Æ.* but 4 in V. Mr Rob. Pearson all *Æ.* and Par.
 in V. Mr Rob. Peckham i, ii, ix, x. all *Æ.* but 4 in V. Par. and 1 Ec. Fran-
 ky Pennell all *Æ.* in V. pr. 1 Q. and 1 *Æ.* Mr Jos. Pilgrim i. 1, 3, 5, 6.
 Par. pr. 1 Q. Mr Sam. Pilgrim 1, 3, 5, 6 in V. pr. 1 *Æ.* Mr Wm Pirson i, iv,
 vi, viii. pr. 1 *Æ.* R. M. pr. 1 *Æ.* R. all but 6 in V. Mr John Ramsey all
 but 4 in V. Mr John Randles all *Æ.* and Par. pr. 4 Q. and 1 *Æ.* Rimfide
 i, ii, iii, v, vii, x. 1, 2, 3, 5. in V. and Par. Mr Alex. Rowe iv. 1, 3, 5, 6
 in V. Ecl. and Tran. 8. Mr Paul Sharp all but iv and viii. all *Æ.* and Par.
 Mr Cha. Smith all but iv, vii, viii. Mr John Skay Ecl. Mr Wm Spencer all
 but ix, all but 4, Ecl. Mr Geo. Stapley i, ii, v, vii, x. 1, 2, 3, 5, 6. Mr Wm
 Swift all *Æ.* in V. pr. 1 Q. and 2 *Æ.* Mr Ben. Talbot Ecl. and Tran. 8.
 Tabularius i, ii, iii, v, vii, viii. Mr Sam. Towndrow i. 1, 6. Ecl. Mr Ri.
 Towndrow i. 1, 3, 6. Ecl. Tryphena G---- p. 1 *Æ.* Mr Wm Wadham Ecl.
 Mr John Watchorne all but iv and viii. all but 4 in V. Par. pr. 1 Q. and 2 *Æ.*
 Mr John Wiggleworth all but vi and viii. all *Æ.* in V. pr. 1 Q. Mr John Wil-
 liams all but vi. all but 4 in V. Mr Isac Worral all *Æ.* in V. pr. 2 *Æ.*